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THE BUILDING AGE

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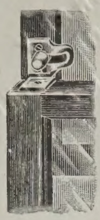

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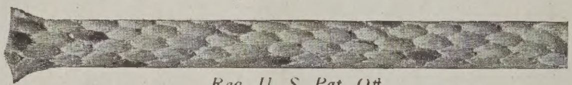

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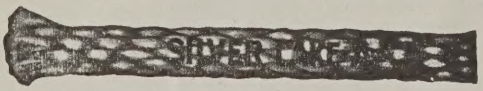

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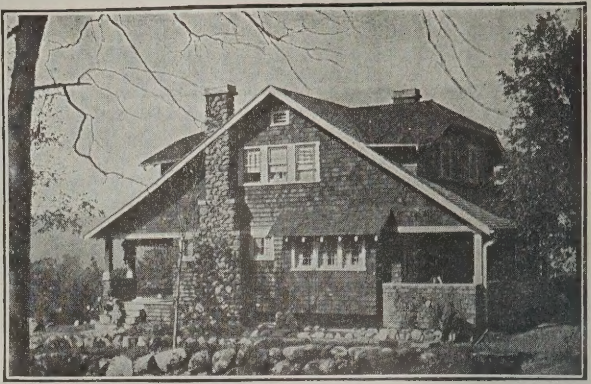

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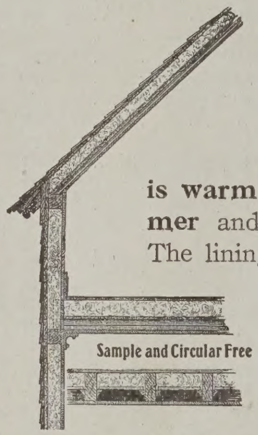

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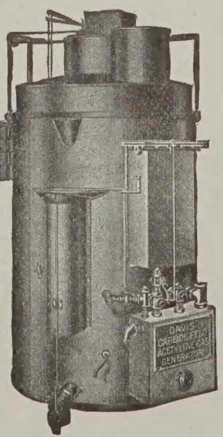

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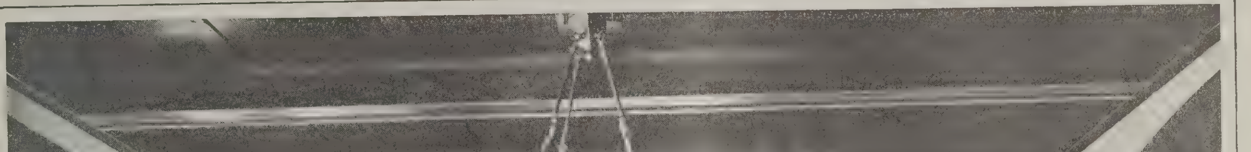
NEW YORK, JANUARY, 1914

A Duplex Dwelling for the Suburbs

A Two-Family House Embodying a Number of Unusual Features of Interest to the Builder

IN practically every large city and especially in connection with its suburban developments a feature of its street architecture is the dwelling designed for occupancy by two families. Sometimes these houses are erected in rows upon rows of monotonous frontage with an attempt here and there to vary the exterior treatment, but where land is more plentiful and not held at too great a premium the two-family dwellings are of the detached type with attractive surroundings in the way of grass plots, flower beds and more or less of nature's foliage. In some sections the two-family house is designated as a "duplex," but this is not by any means universal and in many of the extreme Eastern States it is known only by the former name. In New York City, for example, both terms are employed and there are duplex apartments as well as duplex houses. There is, however, a decided difference between the two, in that while the duplex house is intended to provide accommodations for two families the duplex apartment, which is only to be found in the many storied palatial structures which tower almost to the skies, is intended for the use of a single family, but which occupies space on two floors of the building, the living rooms being on one floor and the sleeping rooms



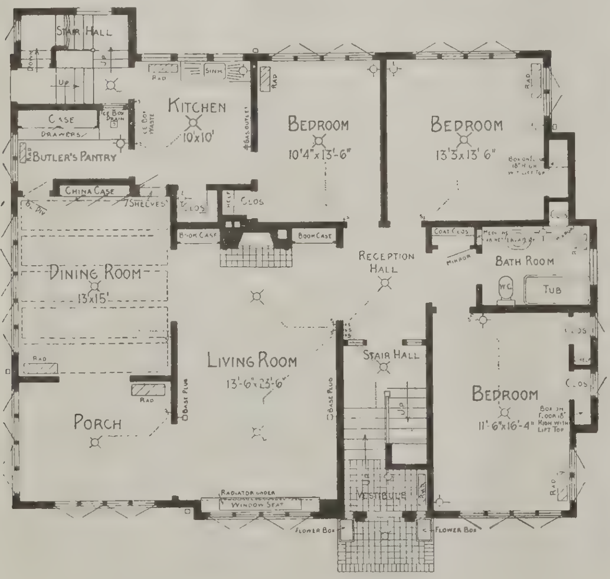
A Duplex Dwelling for the Suburbs—View in Dining Room Looking Toward Butler's Pantry and Built-in China Case—Architect, Perry W. Swern, Oak Park, Ill.

on the floor directly above, reached by flights of private stairs something after the nature of a private house. In such instances, however, only a very small percentage of the apartments in a building having accommodations for 50 or more families are of the duplex type.

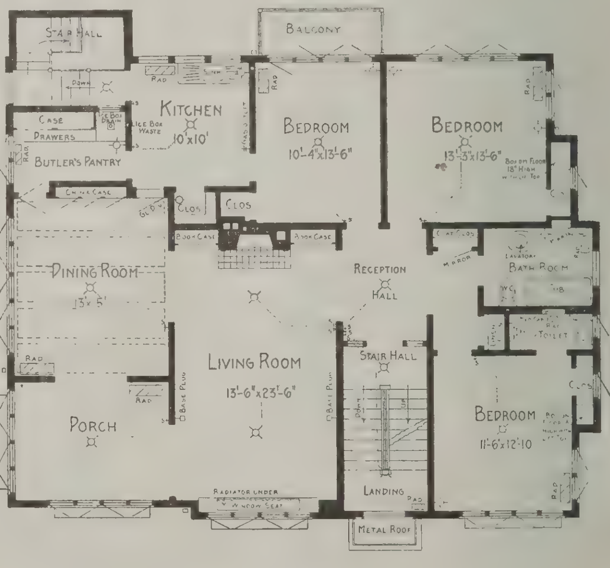
Detail of the Main Entrance

A most excellent example of the detached dwelling designed to house two families and designated in the section in which it has been erected as a "duplex" is that which constitutes the basis of the present article. It is unpretentious in its external aspects, yet involves a treatment that is quietly rich and pleasingly effective. Noticeable features are its porticoed entrance and balcony above, with the stairs leading to the first story within the wall line of the building rather than without as is usually the case; the many mullioned windows in its various facades; the flower boxes at the second story and the surfaces of stucco contrasting with the broken areas of the dormered roofs.

Within, the house shows an arrangement of rooms well calculated to meet the requirements of a modern home with all the conveniences that a dwelling of this character would naturally suggest. The number of the rooms on each floor is the same and the layout is practically identical in both cases. An exception is the toilet on the second floor opening from the master's bedroom, the latter being correspondingly reduced in size as compared with the sleeping room directly below, which is without the private toilet and lavatory.



Main Floor—Scale 1/16 In. to the Foot



Plan of Second Floor—Scale 1/16 In. to the Foot

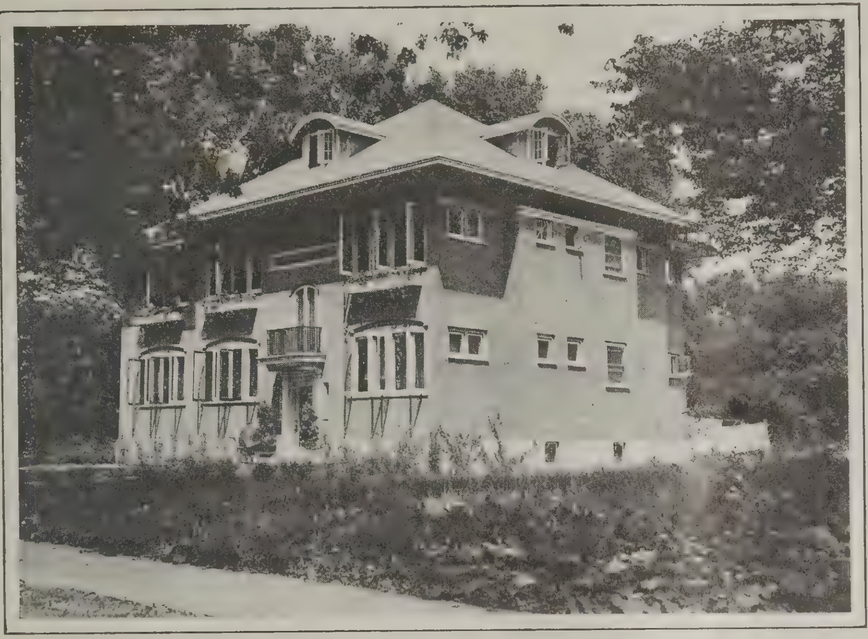
A Duplex Dwelling for the Suburbs—Architect, Perry W. Swern, Oak Park, Ill.

Entering the vestibule through the main entrance flanked on either side by flower boxes, as pictured in the detail, the visitor must ascend a short flight of stairs to reach the broad landing from which opens the reception hall of the family occupying the first floor of the house. Immediately at the left is a large living room amply lighted and having as a feature an open fireplace with a bookcase on either side. An inclosed porch lighted on each of its two sides by a three-mullioned window and opening from the living room, occupies the left front corner of the building. The walls of the porch constitute those of the house itself and from without there is no indication of the porch feature. It is heated by means of a radiator and can be used as a sun parlor or lounging room, as the occupants prefer. Beyond this and at the left of the living room, with both of which it directly communicates, is the dining room with its beamed ceiling, panel wainscoting and built-in china case.

Communication with the kitchen at the rear is established through a well-equipped butler's pantry in which space is provided for a refrigerator or ice box and so placed that it can be iced from a point just at the head of the rear stairs and without the necessity of passing through the kitchen. As the outside rear door is at grade it is necessary for the service men to ascend a flight of five steps to reach the kitchen level on the first floor and it is at the top of this flight that the window for supplying the ice box is placed. From the outside door at grade there is also a flight of stairs leading to the cellar and another by which the second floor rooms are reached. There are three bedrooms for each family, all of good size, provided with clothing closets and heated by radiation. A feature of the bedrooms at the end of the house is the box on the floor 18 in. high and provided with a lift top.

The bedroom next to the kitchen and at the rear of the house on the second floor opens out upon a balcony clearly shown on plan and elevation.

Just at the right of the reception hall is a coat closet with mirror in the face of the door and at the right of this is the bath room with the usual fixtures and medicine cabinet. In the attic are three sleeping rooms for the servants, together with clothes closets and a bath room. The plans here given clearly show the position of the various radiators, the lighting fixtures and the electric switches which communicate with them.



A Duplex Dwelling for the Suburbs—View of Building from the Street

Upon the first page of this article is a view in the dining room looking toward the butler's pantry and showing the built-in china case with the door at the right, which covers the seven-shelf division between dining room and kitchen. The latter enables the ready transfer of cooked and other dishes from the kitchen to the dining room without the necessity of making the circuitous journey through the butler's pantry. The various pictures on the following pages afford an excellent idea of the appearance of some of the principal rooms, while the details show the method of construction.

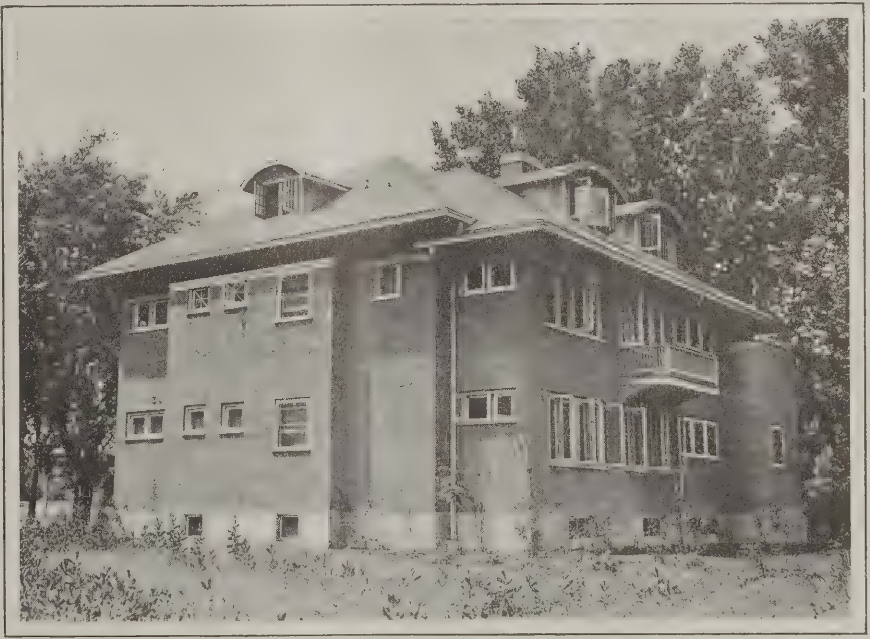
The foundation walls are 12 in. thick, of concrete mixed in the proportions of one part cement to three parts sand and five parts stone. The outside surfaces of the foundation walls around the excavated portions where they come in contact with the earth are plastered with a coat of cement mortar ½ in. thick, the cement mortar being mixed in the proportions of one part cement to two parts sand. After the foundation walls were dry and before any back filling was done the exterior surfaces from footings to grade were given one coat of R. I. W. waterproofing paint.

In the cellar is located the laundry equipped with three-part tubs and gas stove; also boiler room, store rooms and space for the coal supply.

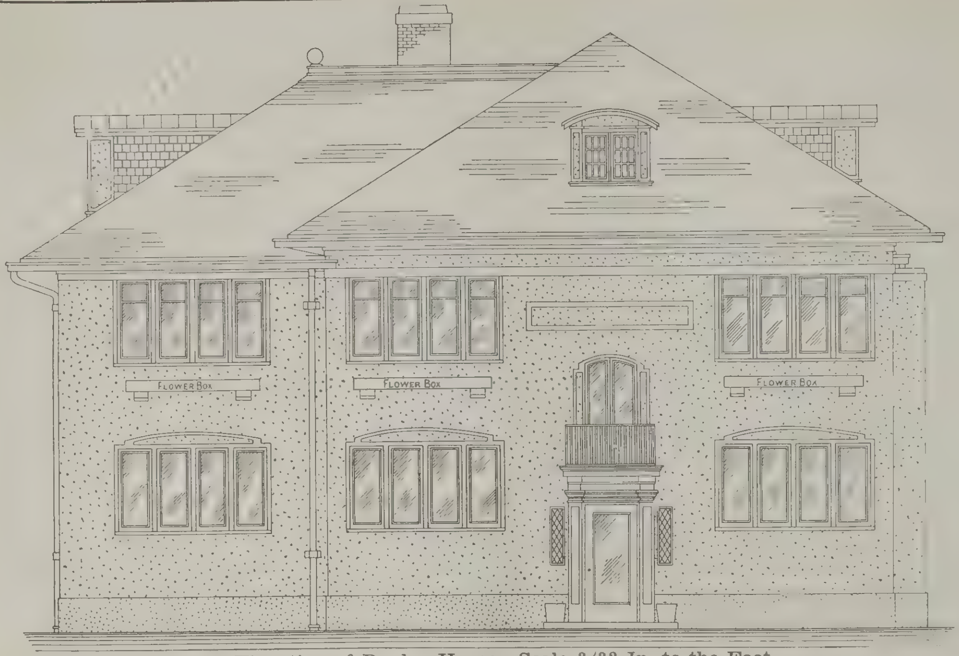
The entire basement floor is of cement and rests upon a 6-in. layer of cinders over which is placed 3 in. of concrete of a 1:3:5 mixture; then a ½-in. finishing coat consisting of one part cement to two parts Torpedo sand was laid and the floor marked off in squares. In the laundry portion of the cellar 1½ x 2-in. beveled sleepers placed 12 in. on centers were embedded in the concrete and to the sleepers was nailed a Georgia pine floor.

All girders and posts are of yellow pine and all joists, studs and rafters are placed 16 in. on centers. The studs are 2 x 3 in. and 2 x 4 in. and the first, second and third floor joists are 2 x 10 in. The headers and dormers are doubled around all stair walls, the dormers and headers being hung in stirrups. The studs are doubled at all openings, angles and corners and all openings are trussed overhead.

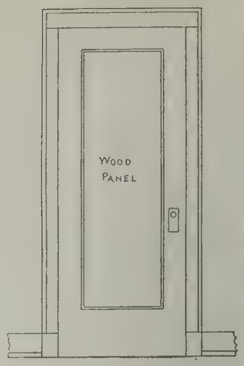
The outside walls from the concrete foundations up, including the sides of dormers, are sheathed with 1 x 6-in. shiplap laid with close joints. The entire roof is covered with ⅞-in. sheathing laid close. Over the outside of all sheathing as well as the under side of all soffits, cornices and projections is placed heavy rosin sized building paper. The roof is covered with slate of standard size laid 7 in. to the weather and fastened with copper clad



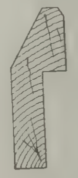
Another View of the House Showing End Elevation and the Garden Front



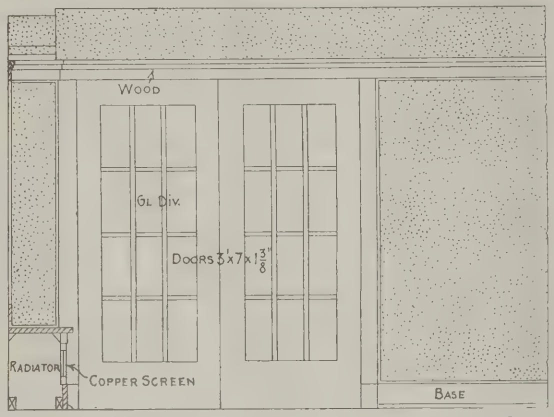
Front Elevation of Duplex House—Scale 3/32 In. to the Foot



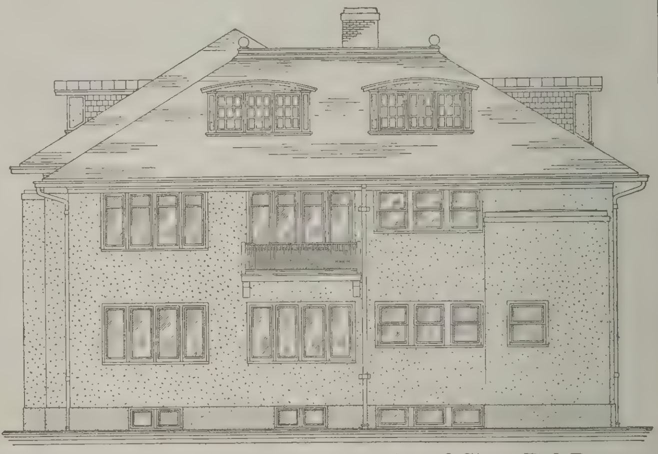
Elevation of an Inside Door—Scale ¼ In. to the Foot



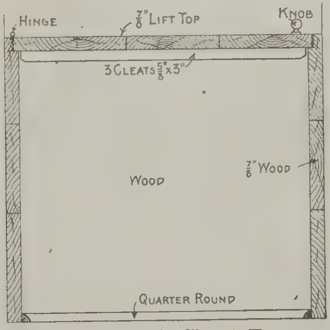
Section of Picture Mold — Scale 3 In. to the Foot



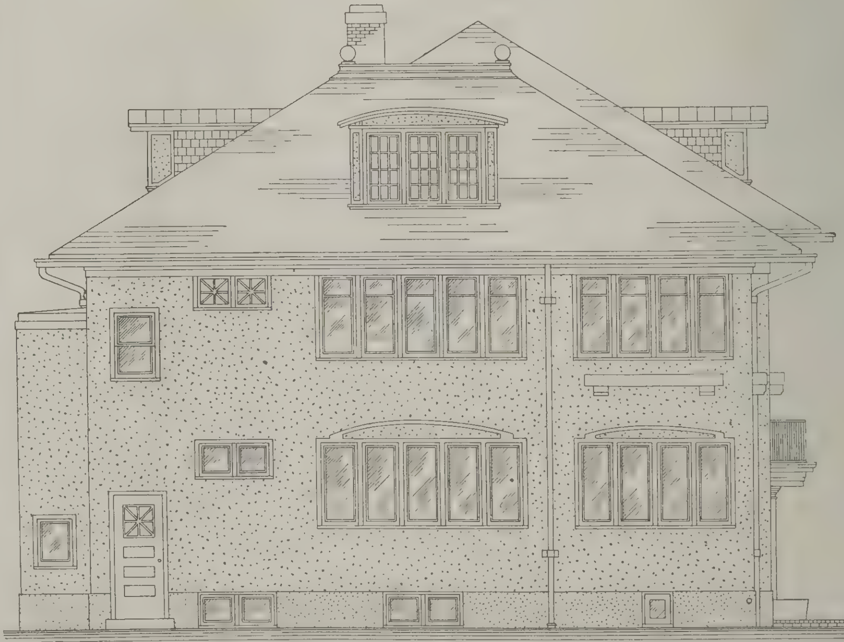
Elevation in Living Room Looking Toward the Porch—Scale ¼ In. to the Foot

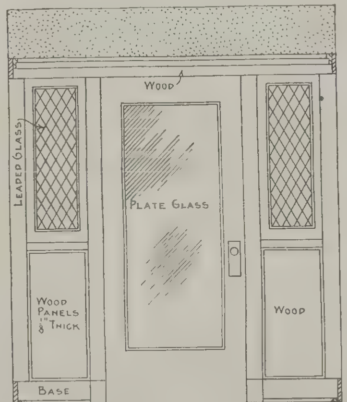


Rear Elevation Showing Balcony at Second Story Bed Room —Scale 3/32 In. to the Foot



Section Through Closet Boxes—Scale ¾ In. to the Foot





Elevation in Reception Hall Looking Toward Entrance—Scale ¼ In. to the Foot

North or Left Side Elevation Showing Grade Entrance to Kitchens—Scale 3/32 In. to the Foot

A Duplex Dwelling for the Suburbs—Elevations and Miscellaneous Details nails. The sides of the dormers are also covered with slate.

Over the building paper on vertical surfaces which are covered with stucco were placed ⅝ x 1⅛-in. furring strips 12 in. on centers. To these were fastened No. 24 gauge expanded metal lath and then the cement plaster applied in three coats. The first coat was composed of hair lime and sand in the proper proportions to which had been added 10 per cent. of Portland cement and the coat well trowelled in to cover the lath on both sides. The second coat was made of two parts clean sharp sand and one part Portland cement and then rough cast with Portland cement and clean cinders to give the proper texture.

The floors of the vestibule and terraces are of 6 x 6 x 1 in. promenade tile with ¼-in. black joints. These floors rest on a 3-in. concrete foundation, the concrete being the same as that specified for the cement floors.

The floors of the rooms are double, the rough floor consisting of 1 x 6-in. boards on which a ⅞ x 2¼-in. finish floor is laid. This finish floor is of oak in the living room, dining room, reception hall and bedrooms; those in the kitchen and butler's pantry are of maple, and that of the porch is of ⅞ x 2¼-in. white pine laid in white lead.

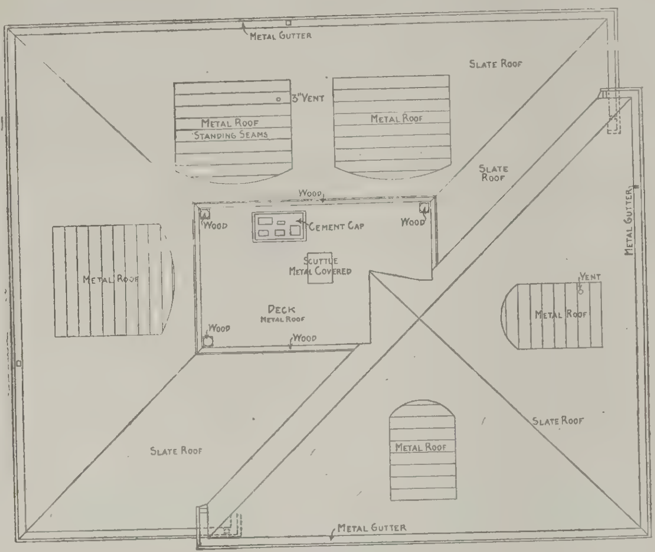
The trim in the stair hall, reception hall, living room and dining room is of oak, the dining room having panelling ⅛ in. thick of this material in the wainscoting and ceiling. The reception halls are also wainscoted with ⅛-in. material. The trim of the three bedrooms and bath room on each of the two floors, also of the kitchen and butler's pantry, is of birch. Each bath room also has cement wainscot and base. The floor of each bath room is of unglazed tile. The doors of the medicine cabinet, the closet in the bath room and the coat closet just off the reception hall are fitted with mirror panels.

Heads and jambs of casement windows are 1⅜ in. thick and all heads of double hung windows are 1⅛ in. thick with pulley stiles, parting strips, etc., ⅞ in. thick. All outside door frames are 1¾ in. thick and all stiles are cut from 2-in. material. All frames are of long leaf yellow pine and were given one coat of raw linseed oil before leaving the mill. All sash are of white pine 1⅜ in. thick with top and side rails 2 in. wide and bottom rails 3 in. wide. All windows are hung with Samson spot cord with wheel and axle pulleys of bronze face.

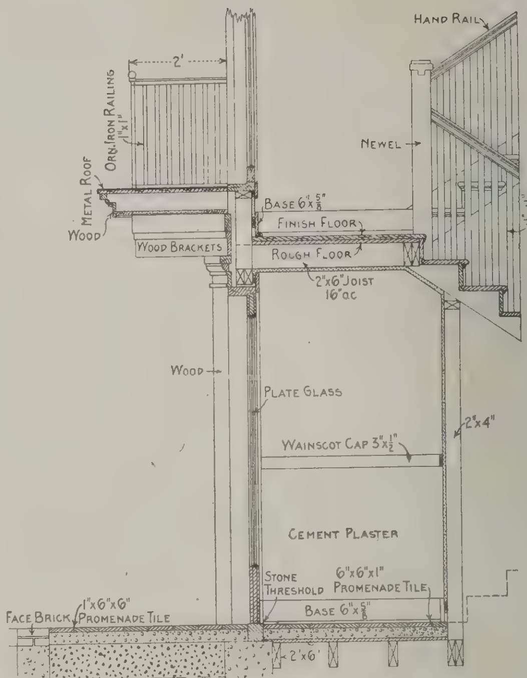
A Duplex Dwelling for the Suburbs—Appearance of the Enclosed Porch When Used as a Sun Parlor or as a Lounging Room

Veneered doors are used in rooms having oak trim and birch doors in rooms having birch finish. All exterior doors as well as doors from stair halls to kitchen and reception hall are 2¼ in. thick, the remaining doors being 1⅜ in. thick.

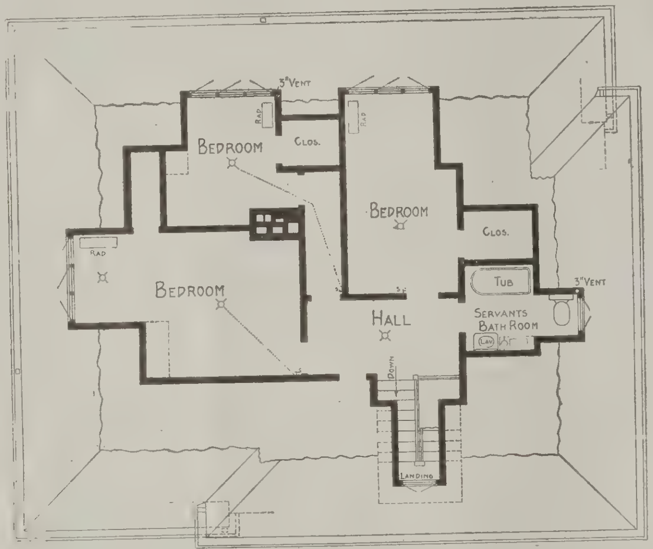
The entrance door is of three-ply white pine construction and those to the reception halls on the two floors are of three-ply oak, all with single plate glass panels. All interior doors have single panels. The bookcases are of the same finish



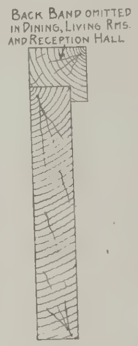
Roof Plan Showing Deck—Scale 1/16 In. to the Foot



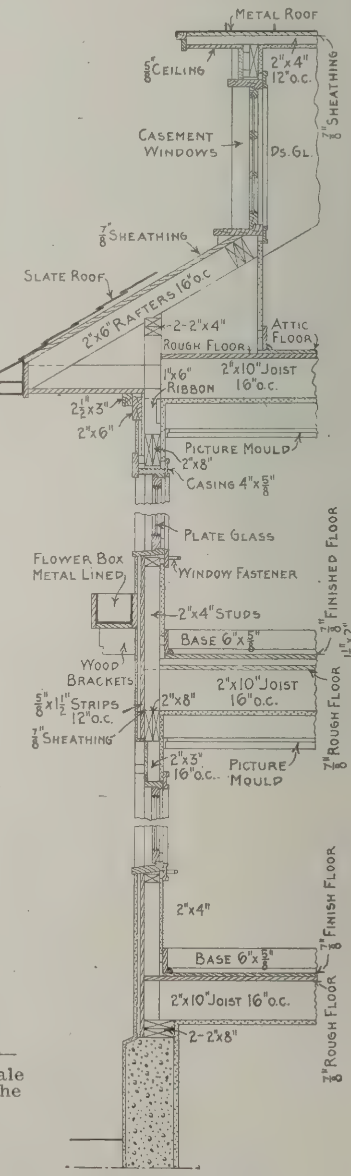
Details of the Front Entrance—Scale ¼ In. to the Foot

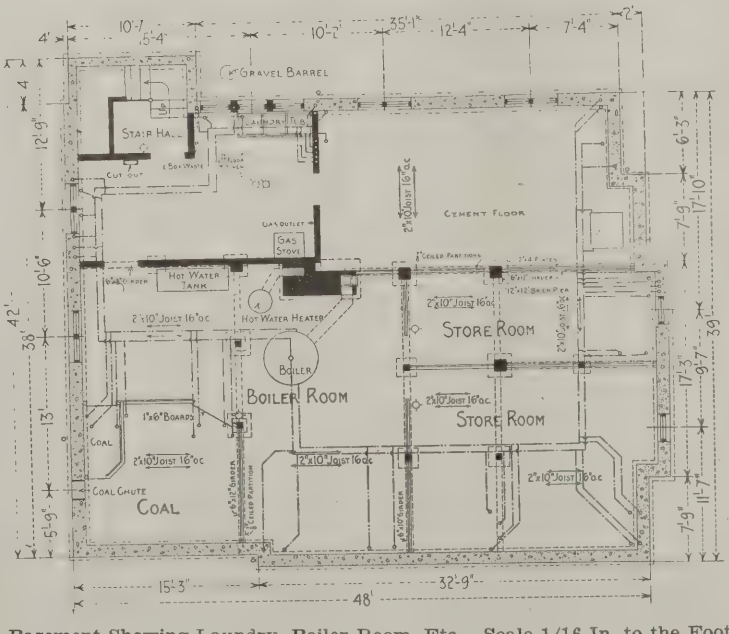


Attic Plan—Scale 1/16 In. to the Foot

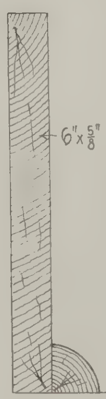


Section of Typical Casing—Scale 3 In. to the Foot





Basement Showing Laundry, Boiler Room, Etc.—Scale 1/16 In. to the Foot



Base—Scale 3 In. to the Foot

Section Through Main Wall—Scale ¼ In. to the Foot

Miscellaneous Constructive Details of a Duplex Dwelling for the Suburbs as the rooms in which they are placed.

The china case in the dining room of each apartment has a top 1⅛ in. thick and is fitted with adjustable shelves. The doors have ½ x ⅜-in. stops. The doors, drawers, etc., of the pantry cases are also ⅞ in. thick with adjustable shelves.

All dormers, bay windows, entrance balcony and deck have metal roofs. All metal is Taylor's Old Style I. C. roofing tin painted on the under side before being put in place.

A Duplex Dwelling for the Suburbs—View Looking Across the Reception Hall Into the Bath Room

All rooms on the first and second floors as well as the finished parts of the attic are plastered with two-coat work, except the ceiling of the dining room and wainscoting in dining room and reception hall. All rooms have a hard white finish, except the dining room which is sand finished.

All oak trim was given one coat of paste wood filler and then one coat of white shellac followed by a coat of Pratt & Lambert's "Dulkote." All birch trim excepting the bath room and toilet room and one bedroom on each floor was given one coat of acid stain, then one coat of white shellac, and this was followed by a coat of Pratt & Lambert's "Dulkote."

The bath rooms, toilet room and two bedrooms were sanded smooth, then given a coat of lead and oil, sanded smooth, and two coats of Pratt & Lambert's "Enamel Undercoating," and then a coat of "Vitralite Enamel."

All white pine trim was given one coat of oil stain and one coat of Pratt & Lambert's finish. The oak floors and stair treads were given one coat of paste wood filler and two coats of Pratt & Lambert's floor varnish.

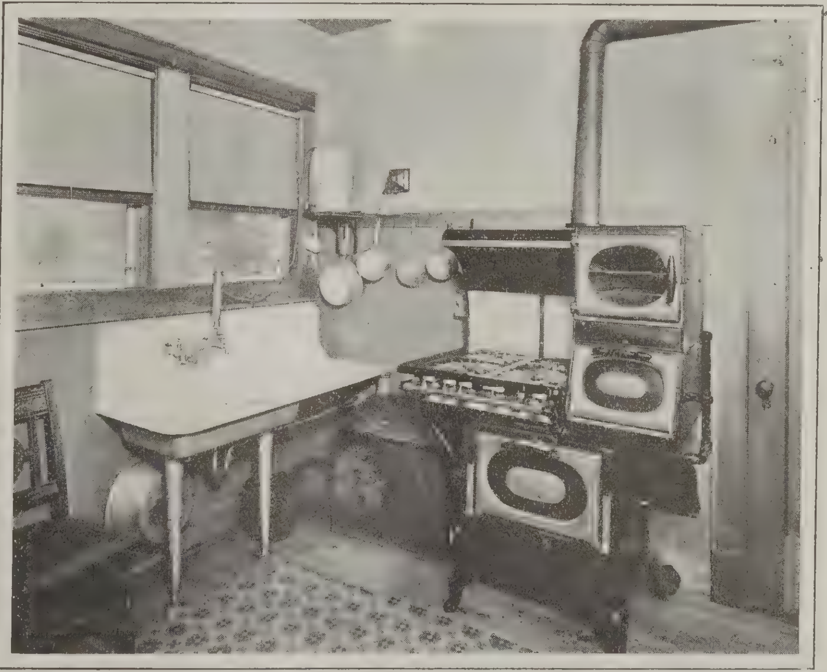
All of the large casement windows, entrance doors, and kitchen case doors are of first quality plate glass, the remaining windows being glazed with "A A" double strength glass.

The entire building is heated by a two pipe hot water low pressure gravity system with open expansion tank and with supply and return mains in the basement. The apparatus consists of an "Ideal" boiler made by the American Radiator Company, Chicago, Ill., and has a capacity of 1800 sq. ft. The expansion tank is of steel and measures 14 x 30 in. in size. The mains in the basement have a fall of not less than 1 in. in every 10 ft. from the highest point of the heater to the extreme ends of the mains where they are connected to the return opening of the heater. All risers on outside walls are wrapped with asbestos sectional covering.

In the bath room of each apartment is a vitreous china "Siwelclo" noiseless siphon jet closet with low down pattern vitreous china "Bellemead" tank in combination, made by the Trenton Potteries Company, Trenton, N. J.

In the second floor toilet room and the third floor bath room is an Illinois pattern china water closet with nickel plated trimmings. Each main bath room also has a 5-ft. solid porcelain bath tub. The third floor bath room has a 3-in. roll rim enameled tub fitted with nickel plated combination fixtures. Each main bath room has a solid porcelain oval lavatory measuring 33 x 24 in., mounted on a plain round porcelain pedestal and fitted with nickel plated brass trimmings. The toilet room on the second floor and the third floor bath room has a 18 x 20-in. vitreous china lavatory with integral back and integral brackets.

In the kitchen is a 20 x 30-in. enameled iron sink with integral back and integral right and left hand drain boards supported on a wall hanger, the hight of the sink being 37 in. from the floor.



View in the Kitchen Showing Up-to-Date Arrangement and Equipment

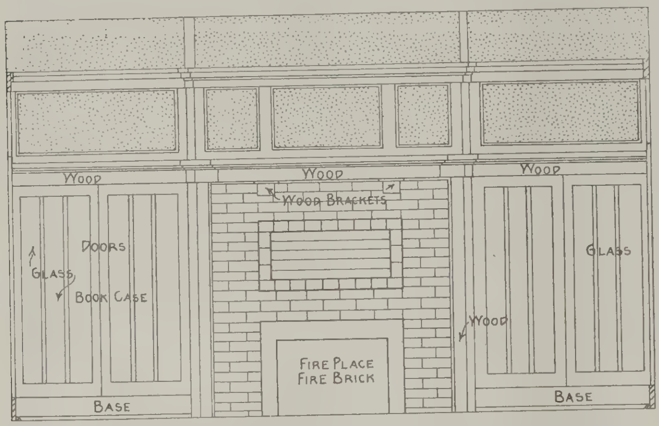
In the basement is a 150-gal. hot water tank located as shown on the floor and connected to all fixtures excepting the closets.

The house is piped so as to supply gas to the ranges in the kitchen and laundry and also to one bedroom on each of the first and second floors.

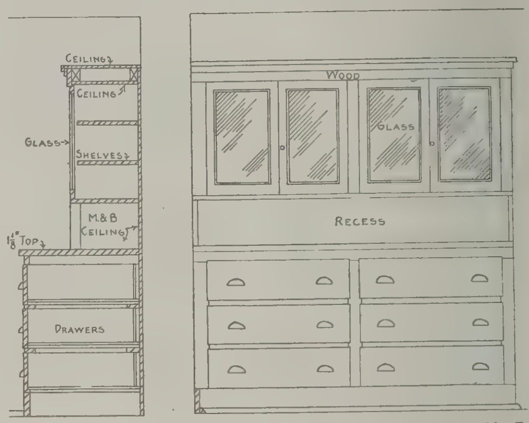
The house is also wired for electric lighting and bells, the work being done in accordance with the

Board of Fire Underwriters. Double pull switches of knife pattern are used at main connection and "Hart" push button switches elsewhere. Push buttons are placed in the front vestibule—one to operate a bell in each kitchen and there is also a push button in each kitchen to operate a bell in the laundry and bedroom in the attic.

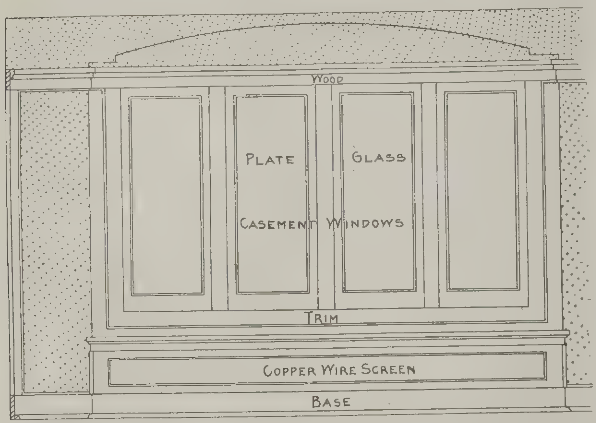
The duplex house here illustrated and described was erected in Oak Park, Ill., in accordance with plans and specifications prepared by Perry W. Swern, architect, of 417 South Grove avenue, Oak Park, Ill.



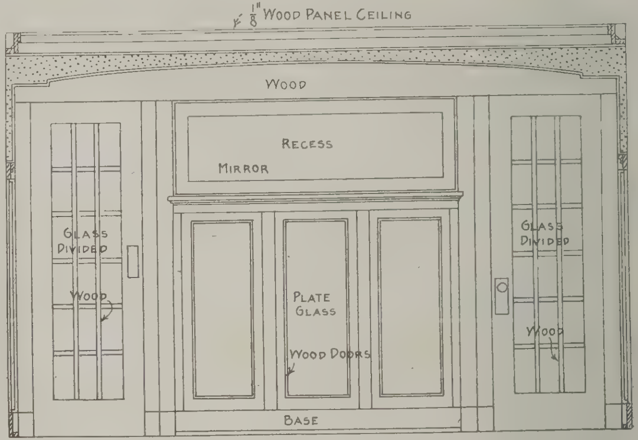
Detail of Fire Place in Living Room—Scale ¼ In. to the Foot



Section and Elevation of Pantry Cases—Scale ¼ In. to the Foot



Elevation in Living Room Looking Toward the Street—Scale ¼ In. to the Foot



Elevation in Dining Room Looking Toward the China Cases—Scale ¼ In. to the Foot

A Duplex Dwelling for the Suburbs—Miscellaneous Constructive Details

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Minimizing the Fire Waste

The roster of cities which are vigorously striving to control the annual fire waste within their boundaries now includes Philadelphia, Pa. The Fire Prevention Commission of that city has been in close touch with the local situation as well as with that throughout the country for some time. Some three months ago the commission instituted a special investigation with a view of determining how the local fire loss might be decreased. The members of this commission learned that the city of Youngstown, Ohio, had in ten years diminished its annual fire loss more than 99 per cent. by constant and competent property inspection. Accordingly the commission recommended that a similar inspection system be organized by the city officials. Fortunately this recommendation met with approval, and backed by efficient laws the Mayor and the Director of Public Safety are supporting the movement. Steps have already been taken to educate several inspectors who are to form the nucleus of a comprehensive corps of inspectors. It is hoped to have all the important buildings within the city inspected within the next half year. The annual fire waste throughout the country has acquired such gigantic proportions that a somewhat concerted movement has been made in many sections of the country to cure this economic evil. Readers of this journal who are engaged in fire-resisting construction should look on this movement as one of more than passing moment to the welfare of their business. It is to their interest to keep posted on what is being done along these lines and to keep in touch with the findings of all investigations. Facts may be brought to light which will help in promoting a wider use of various building materials if presented in a proper manner to a prospective customer. There is sufficient evidence available to convince any prospective builder of the fire retardant qualities of sheet metal, for example, and he will the more readily consider its use if he is aware of the possibility of a rigorous fire inspection service being instituted in his city. There is, therefore, a commercial value in this movement which sheet metal contractors and others connected with the building business should not neglect.

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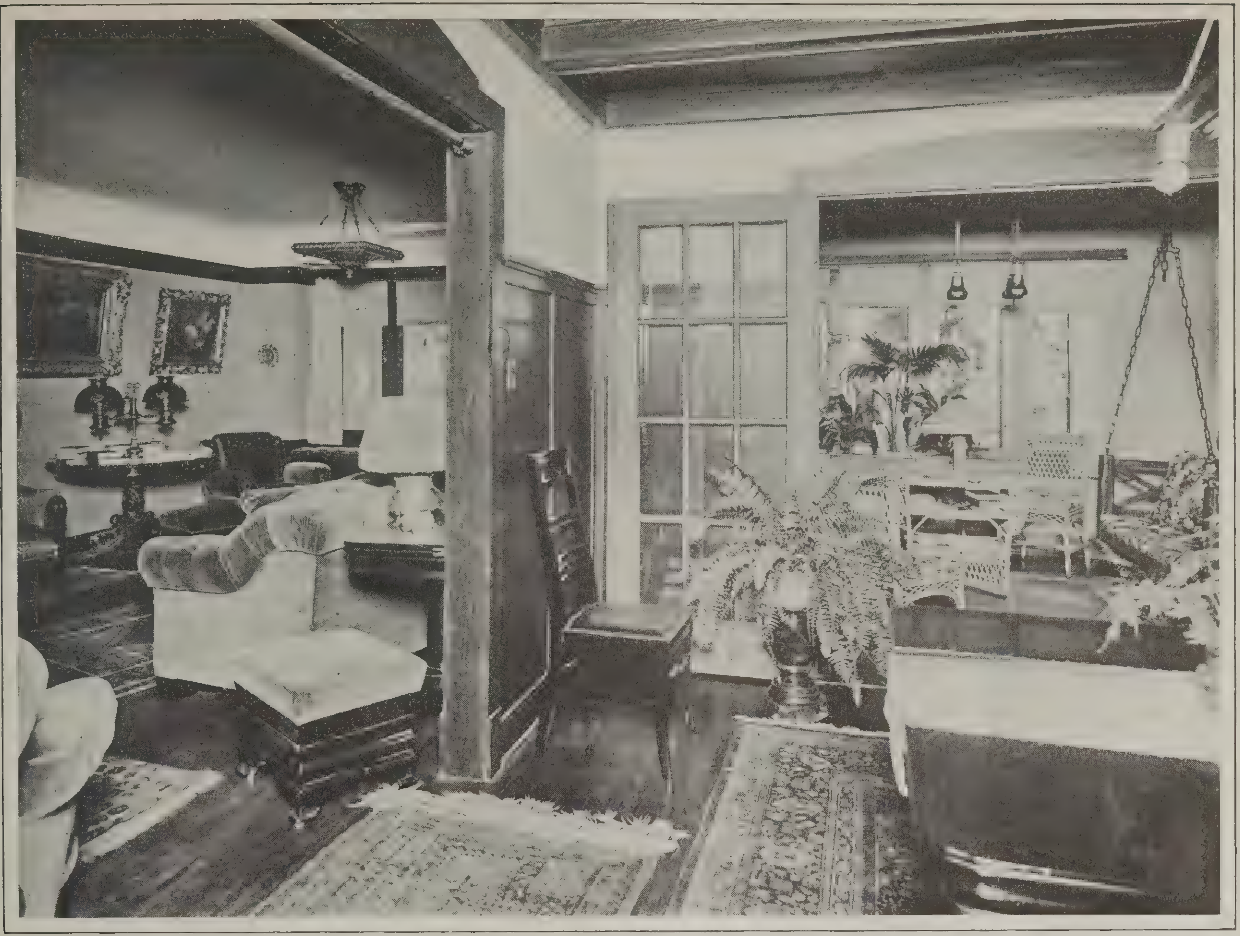
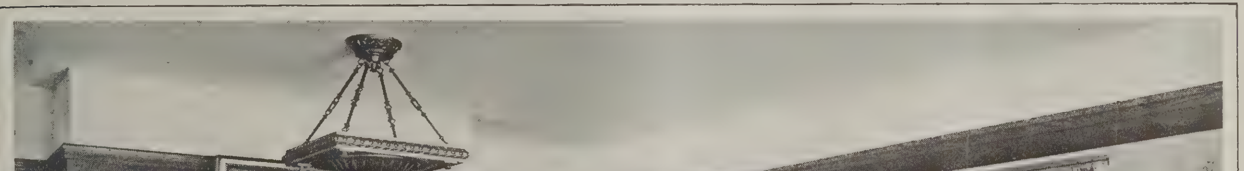
The Milwaukee Athletic Club, Milwaukee, Wis., is soon to have a new clubhouse to cost with the site about half a million dollars.



View in Dining Room Looking Into the Living Room at the Left and Into the Enclosed Porch at the Right



View in Living Room Looking Toward the Fireplace—The Doors Leading to the Reception Hall and Bedrooms Are Seen at the Right

A Duplex Dwelling for the Suburbs—Architect, Perry W. Swern, Oak Park, Ill.

The Building Age for 1914

Beginning with the present issue *The Building Age* enters upon the thirty-sixth year of its existence and it is with pardonable pride that we refer to the enviable record which it has established among the trades addressed during that period of time. Not alone in the nature of its subject-matter but in its typographical features has it forged to the front, until to-day it stands in a class wholly by itself as a progressive monthly publication, exemplifying the practical aspects of the building business in a way to strongly appeal to the classes among which it so widely circulates.

The policy which has been pursued in the past will be continued in the future and no time, labor or expense will be spared to still further excel along the lines indicated. In keeping abreast of the times important changes are necessary at irregular intervals and in running over the pages of the present issue the observant reader will notice a difference in their appearance as contrasted with previous numbers, which we trust will prove pleasing to him. While the changes that have been made deal largely with typographical features, consisting as they do of an entirely new dress of type throughout, with headings, panels, borders, etc., they are of a nature to add dignity and clearness and at the same time render the paper more attractive, we think, than ever before.

Another feature which we feel sure will strongly appeal to the more than 50,000 readers of *The Building Age* is the colored supplemental plate which, in addition to a cover design, will hereafter be found in each issue in connection with plans, elevations, details and brief specifications relating thereto. These designs will be prepared by well-known architects of the country, the work of some of whom is already more or less familiar to the patrons of the paper.

In the future as in the past a great deal of attention will be given to designs of attractive buildings calculated to meet a wide range of requirements; also to miscellaneous matters of a technical nature intended to render the columns still more educational in character and serve as an aid to those who are seeking information on different phases of building construction. In the embellishment of the pages use will be made of a high standard of pictorial illustration combined with line engraving, all designed to maintain *The Building Age* upon that plane of excellence which it has already established.

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Building Operations in 1912

According to statistics contained in an advance chapter from a report of the United States Geological Survey covering 105 cities of the country, each having a population of 35,000 or more, there were 198,272 permits issued for building construction in 1912, costing $660,440,573. New buildings of every variety cost approximately $584,098,902, or 88.44 per cent. of the total; additions, alterations and repairs accounted for $74,914,122, or 11.34 per cent. of the total, while $1,427,549 were reported as wooden buildings unclassified.

Taken by classes the new wooden buildings constituted 24.43 per cent. of the total cost and new brick buildings 52.79 per cent. of the total, while all other new buildings constituted 11.22 per cent. approximately. Of the cost of new buildings 72.37 per cent. was for all fire-resisting buildings and 27.63 per cent. for wooden buildings. Of the cost of all new fire-resisting buildings, 82.48 per cent. was for brick structures; 1.40 per cent. for stone buildings; 8.34 per cent. for concrete blocks and 7.78 per cent. for all other fire-resisting buildings.

Operations on brick buildings, that is, including both new structures as well as additions, alterations and repairs cost $390,915,598, or 59.19 per cent. of the entire cost of all operations in the 105 cities in question; all other fire-resisting buildings contributed $79,743,093, or 12.08 per cent.

The average cost of new wooden buildings in the 105 cities in 1912 was $2,011; of new brick buildings $13,625; of new stone buildings $32,144; of new concrete buildings $28,880 and of miscellaneous fire-resisting buildings $24,578.

The largest number of new wooden buildings constructed in any one city in 1912 was in Los Angeles, Cal., the number being 10,672, costing $16,442,162, or an average of $1,541; while the city of Detroit was second, reporting 5,685 new wooden buildings, costing $11,803,410, or an average of $2,076.

New York City reported for 1912 the greatest cost of fire-resisting buildings including additions, alterations, etc., the total being $162,193,893, or 34.46 per cent. of the total cost of this class of buildings in the 105 cities. This was an increase of $27,532,844, or 20.45 per cent. over 1911.

Of the other larger cities only Cleveland and Kansas City, Mo., showed decrease in this class of buildings.

The following showed an increase in this class of structures in 1912 over 1911: Atlanta, $3,368,908, or 163.82 per cent.; Boston, $5,767,827, or 41.90 per cent.; Buffalo, $1,904,463, or 37.4 per cent.; Detroit, $4,085,255, or 45.67 per cent.; Indianapolis, $564,322, or 14.34 per cent.; Los Angeles, $4,821,511, or $54.81 per cent.; Milwaukee, $2,278,462, or 39.11 per cent.; Minneapolis, $610,305, or 8.04 per cent.; Oakland, $939,267, or 45.01 per cent.; Rochester, $1,729,690, or 57.49 per cent.; San Francisco, $2,006,772, or 16.91 per cent.; Seattle, $821,450, or 38.38 per cent.; and Washington, $3,442,031, or 26.52 per cent.

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Officers American Institute of Architects

At the forty-seventh annual convention of the American Institute of Architects held in the City of New Orleans, December 2 to 4 inclusive, the following officers were elected for the ensuing year:

President—R. Clipston Sturgis, of Boston.
First Vice-Pres.—T. R. Kimball, of Omaha.
Second Vice-Pres.—F. C. Baldwin, of Washington.
Secretary—J. K. Boyd, of Philadelphia.
Treasurer—J. L. Mauran, of St. Louis.
Auditor—T. J. T. Fuller, of Washington.
Directors—Walter Cook, New York; W. R. B. Wilcox, Seattle; Octavius Morgan, Los Angeles.

As secretary, Mr. Boyd succeeds Glenn Brown, who has held the office for twelve years. Fitting resolutions were adopted in recognition of his services to the institute.

Hoisting Rigs for the Builders' Use—IV.

How the Gin Pole Can Be Used to Advantage—Details of Its Construction—A Convenient Means of Raising It

By Edward H. Crussell*

SOMETIMES in building construction gin poles are used without guy lines; the pole being lashed or braced to some portion of the building. Suppose, for instance, that after the roof trusses are up the guy lines are in the way. The pole is still needed to raise the roof beams, or the roofing, so it is lashed fast to one of the roof trusses and the guys taken off.

With the pole fixed in this manner, it is not possible to land the load by slacking off the guys, but as these loads are usually lighter they can, in most cases, be drawn in by hand. Where there is a considerable amount of material to be raised, however, it may pay better to make an addition to the gin pole as shown in Fig. 26. This addition consists of a cross-piece pivoted to the top of the pole and fitted with two sheaves, as shown. This cross-piece will turn, as the top man hauls in on it, and allow the load to be landed. The two sheaves are set equal distances from the center pivot, and as the strain on the fall line must equal the weight of the load, no difficulty is found in keeping the cross-piece balanced.

If it should be necessary to use pulley blocks in connection with this cross-piece, it is best arranged as shown in Fig. 27. As there are three lines leaving the movable pulley in Fig. 27, the weight on this pulley will be equal to three times the power on the fall line, and if the pulley sheave is 2 feet from the pivot of the cross-piece, the fall line sheave must be 6 feet, or three times as far. Note: Distances are measured from centers of sheaves.

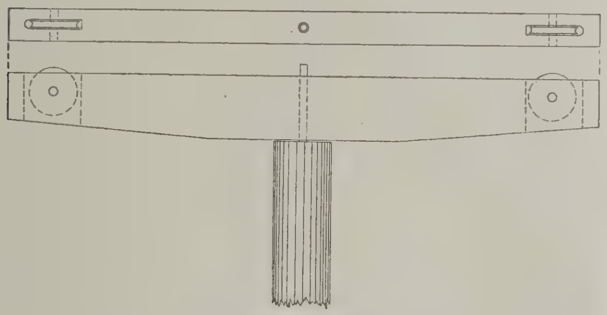
Fig. 26—Cross-piece Attached to Gin Pole for Greater Ease in Landing the Load

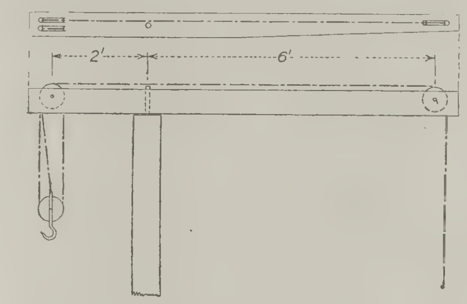

Fig. 27—Style of Cross-piece Required When Used with Pulley Blocks

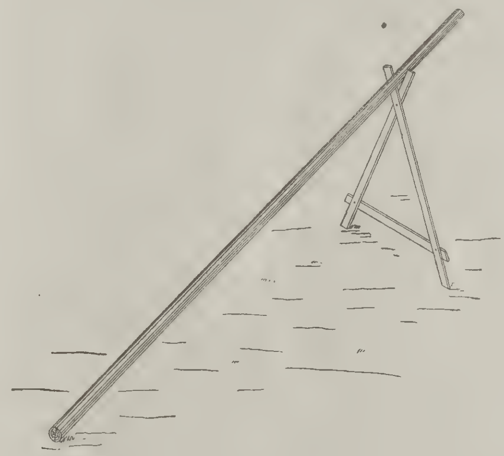
Fig. 28—Horse Formed of Crossed Sticks for Assistance in Raising Gin Pole

Hoisting Rigs for the Builders' Use.—IV.

A considerable amount of both time and energy is often wasted in the erection of gin poles or derricks when the work is undertaken by those who are not familiar with it. Where there are sufficient men available, gin poles up to 35 or 40 feet high can be erected by "walking them up." The pole is laid out in the best position, with its upper end resting on a saw horse or something similar, and its foot close to the position it is to occupy when erected. The guy lines are attached and stretched out towards the anchors, which should all be in place. The tackle that is to be used with the pole can be attached and sent up with it, or sent up afterward. Where it is decided to send it up with the pole the blocks should be stretched out, and to keep the lines from fouling and getting in the way, they should be tied to the pole with light lashings that can be broken with a pull on the tackle after the pole is up. Sending up the tackle in this manner adds considerable to the weight of the pole, but it is the easiest way of attaching the tackle. The foot of the pole should now be held in place either by tying it to something; putting it in a shallow hole in the ground, or by having some capable man hold it with a pinch bar. (Tying it is the writer's preference.) Then, with a man at each of the side and forward guys, and the rest of the men distributed along the pole to the best advantage, "up she goes." If there are men to spare, they should be placed on the forward guy, because once the pole has started up, hauling on this guy will assist in raising it, especially if it is snubbed around the dead man or anchor.

Many of the old-timers used this forward guy almost entirely for erecting derricks or gin poles. The top end of the pole was first raised as high as possible on the crossed sticks shown in Fig. 28.

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*Copyright 1913, by Edward H. Crussell.

No one is needed at the rear guy until the pole is almost perpendicular, then, with the man in charge giving the signals, the guys are slacked off or tightened up until the pole is plumb.

Most Practical Method of Erecting a Gin Pole

The foregoing describes one method of putting up the pole, but the most practical method of erecting it, as almost any other form of hoisting device, is by means of another gin pole. A gin pole of about 4″ x 4″ x 20′ can be temporarily erected and guyed and with this the larger pole can be set in place.

It is best, wherever possible, to have the gin pole of such a hight that the load may be slung above its center of gravity, and enough space besides to clear the tackle. With a light load, such as another gin pole, this is not so important, because the lower end of a load of this nature can be weighted or held in place until the upper end is raised into position; so that a piece of 4″ x 4″ x 20′ (which can be easily up-ended by one man) may be used to raise a 40-foot pole and the 40-foot pole used to raise one of 75 or 80 feet and so on to the end.

Weighting Lower End of Load

Concerning the matter of weighting or holding down the lower end of the load, the writer, some time ago, stood with a number of other spectators watching a gang of men erecting the steel columns of a bank building. The columns were about 40 feet high and a boom derrick with a hoisting engine was being used in their erection. The man in charge had set the derrick in the center of the building, in which position it had sufficient reach to set all but the four corner columns. With the boom lowered sufficiently to reach the corners, the columns had to be slung below their center of gravity, so they loaded the foot of the columns with a number of coils of wire rope and some other junk and set them up in that way. The hoisting engineer had a good view of the work and presently stopped hoisting and drew the foreman's attention to the fact that the tackle was "block and block." The foreman's troubles were, no doubt, beginning to affect his nerves; his reply cannot be printed *verbatim*, but it covered a large range of subjects in the fewest possible words, and ended with the statement that the engineer was not being paid for running the job, but for running the engine, that the man in charge would give him the signal when he wanted him to stop and that until he got that signal he was expected to earn his money by keeping his mouth shut and his engine running.

When Hoisting Engineer and Foreman Clash

This little lesson evidently touched the spot, for without another word the engineer started the engine and kept it going until the blocks were jambed one in the other, and the boom started to lift, at which point Mr. Foreman gave him the stop signal. The column was now high enough, but the manner in which it had been cinched up had drawn the foot of it in towards the derrick, and with the work in this shape, and not an inch of slack in the tackle anywhere, the foreman and some four or five men took hold of the foot of the column and tried to force it out to its place by surging on it. This looked to the writer like a good start towards accidents, and not particularly wishing to witness anything of the kind, he went on his way, considering meanwhile, the perversity of the human mind. Mr. Foreman had evidently made up his mind to set all of his columns while the derrick stood in the center of the building and overlooked the fact that it would be easier, safer and quicker to move the derrick for each of the four corner columns. The distance moved did not need to be more than two feet, and as his guys were all fastened with long turnbuckles, he could have moved the derrick in about the same space of time that it took him to weight the foot of his columns.

Sizes of Gin Poles

This concludes our discussion of the gin pole, though the theme is by no means exhausted. Many workmen look upon it as only a makeshift, not fit for permanent or continuous use, and may perhaps be surprised when told that gin poles of steel 100 feet high have been made and erected, and as a final item, *The Railway and Engineering Review* some years ago contained an account of a gin pole, 50 feet high, made of three 8″ x 16″ timbers bolted together, being used for placing some bridge girders that were 88½ feet long, 8 feet deep, and weighed 35 tons each.

(*To be continued.*)

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The Passing of the Thatch Roof

A short time ago we presented in these columns a very interesting article from an English correspondent relating to thatch roofs and the manner in which they were constructed. The fad, if it may be so designated, for this form of roof is evidently passing if we may judge from current issues of the London building papers. A writer in one of them, discussing the subject, points out that one of the principal reasons for abandoning thatch in Dorset and Devonshire is the frequency of fires caused by sparks from traction engines, which are now so extensively used on the roads. So numerous have been the fires from this cause that landlords owning thatched cottages and houses abutting on the roads have removed the thatch, although, in many instances, their love of the picturesque has rendered them most unwilling to adopt such a course.

The well-to-do replace the thatch with tiles, but, unfortunately, the less wealthy, who are in the majority, are adopting corrugated-iron as a substitute. As a rule this is painted a chocolate color, and the effect is not so unsightly as might be imagined; but the loss in comfort must be very serious, especially in small, low-roofed cottages. The thatch has been an ideal covering, besides being picturesque, as it is cool in summer and warm in winter; whereas the galvanized-iron has nothing to recommend it except that, for a time, it is watertight.

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According to the annual report of the State Superintendent of Insurance the fire loss in the United States and Canada during 1912 amounted to approximately $225,000,000. This was about $9,000,000 less than in 1911 and $2,000,000 less than the average for the last five years.

Advantages of a Builders' Exchange

How Contractors and Builders May Profit Through Membership—Contractor's Bonds and Architect's Specifications

BY J. CROW TAYLOR

IN practically all large cities there is an institution known as The Builders' Exchange which might profitably be copied by contractors and builders in the smaller cities and towns and to which many more of the builders than now do, might well belong.

The Builders' Exchange is an institution that is only limited in its greatness and usefulness by the extent and manner in which it is used. In the larger cities there are Builders' Exchanges doing excellent work though seldom as well patronized as they should be. Every contracting carpenter and builder in such cities should be an active member of The Builders' Exchange because it adds to his own progressiveness and puts him in closer touch with what is going on around him both in the way of offerings and in the way of building operations. In the smaller places the Exchange idea of the larger cities should be emulated, and in every town that has two or more contractors there should be a co-operative meeting now and then to get together and work in harmony on matters of mutual interest.

Where Good May Be Done

To illustrate graphically in one particular instance where good work may be accomplished through a Builders' Exchange, take the matter of contractor's bonds and architect's specifications. It is sometimes found that architect's specifications are so ambiguous and leave the deciding authority so much with the architect that bonding companies are reluctant to furnish bond for contractors bidding on such work. In many instances it is within the power of the architect to make the work so difficult for the contractor that it might break him or result in the owner going to the bondsman for some form of reparation.

Some time ago the Builders' Exchange of Louisville took up this matter and has been agitating it with a view toward establishing uniform specifications so that when a contract is let there may be a more definite and clear understanding as to all the details, and less likelihood of error and misunderstanding which at times lead to such unexpected extra costs as to bring loss to the contractor.

A Board of Arbitration

Other Builders' Exchanges following along this same idea have established a plan with the architectural organizations by which in a case of misunderstanding or disagreement a Board of Arbitration handles the matter and in this way better satisfaction is secured for all concerned.

Another thing, and one which The Builders' Exchange of Louisville has been doing of late, is by being organized in a body in this way the builders of the community can get more attention from local papers. The Builders' Exchange of Louisville made an arrangement for a page more or less in the Saturday afternoon edition of one of the local daily papers to be devoted to building subjects. This not only makes the paper in question of particular interest to all builders but it also makes it worth more as an advertising medium to the contractors and it places the building industry of the city before the public in better shape. In some of the larger cities special local building papers are published which carry official and other matter in connection with The Builders' Exchange and local building operations, but in cities not large enough to support a publication of this kind The Builders' Exchange puts the trade in a position to receive attention in the local papers which helps the cause considerably.

Many Matters of Mutual Interest

There are many things of general and mutual interest to carpenters, contractors and builders which can be handled and promoted through The Builders' Exchange, even in the smaller cities and towns, and the cost of maintaining an organization of this kind should not be prohibitive. It is simply a matter of getting together and of keeping it up, not merely getting together when some matter of immediate importance arouses special interest, but it is worth while to keep the machinery of such an organization in good working order all the time. It should also be worth the price for all carpenter-contractors and builders in the larger cities to become active members of their local Builders' Exchange. The progressive spirit it arouses is worth the cost and there are many other ways in which an Exchange can serve a builder from time to time.

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The Building Contractor in India

The average building contractor in India is usually the man who has money or credit, but who does not himself always understand drawings or measure up work, and must, therefore, depend on clerks for this duty. The foremen are frequently more in the nature of labor contractors than trade experts, and in the execution of work serious friction often arises between architects and contractors. Very often the chief desire of the owners of projected buildings is for showy facades and allowance is given for only the lowest building rate for masonry and woodwork. The masonry, carpentry, joinery, plumbing and painting, except in special cases, are all inferior.

A builder will occupy the sidewalk of a busy street for a couple of years as a store for building materials which are delivered prematurely, instead of being brought day by day, as wanted, while the interior of the building may be filled with rubbish.

The carpenters and joiners must find their own tools and rarely have more than a third of a set.

Frame House of Compact Arrangement

Square Form of Building the Most Economical — Showing How Symmetrical Treatment of Upper-Story Plan Increases Available Area

THE design of the second story of a dwelling may be handled in two ways—the walls may be carried directly up to the ceiling line of the second story, or the roof may be extended from the ridge line to the level of the floor timbers of the second story and the otherwise restricted space of the second story rooms may be increased by dormers. The latter plan has been adopted in the house illustrated in its various details in the following pages. Another principle of design has been followed in laying out the floor plans of the house; that is, the more nearly a dwelling approaches a square in plan, the nearer will the cost approach the minimum for the area enclosed.

The First Floor Arrangement

On the first floor, a large living room is provided with fireplace and built-in bookcase. A built-in china closet is a feature of the dining room, the large bay window in which insures plenty of light and air for this important part of the house. A pantry of ample proportions connects the dining room and kitchen.

On the second floor every bed room has windows looking in two directions and each room is provided with a large closet. All of the bed rooms are within easy reach of the bath room and of the stairs leading to the first story.

Details of Construction

The foundation walls of the house are of concrete, 10 in. in thickness, mixed in the proportion of 1:3:5, resting on a footing of concrete 10 in. in depth and projecting out to a point 6 in. from the exterior surface of the foundation wall on either side. The foundation walls are covered on the exterior with a heavy coating of waterproof cement plaster.

The chimneys are set on a concrete foundation, are built of common hard burned brick, and the flues are lined with fire clay flue tile. The exposed surfaces of the chimney are covered with two heavy coats of stucco of a sand finish. All timber, except where otherwise specified, is of spruce and the principal members of the frame have the following dimensions: sill plate, 4 x 6 in. laid flat and halved at corners; spruce girders, 6 x 8 in.; the beams for the first and second floors are of 3 x 10 in.; long leaf yellow pine placed 16 in. on centers; the main rafters are 2 x 8 in., placed 20 in. on centers; the ridges are 10 x 1¼ in.; the posts at corners and angles, 4 x 6 in.; while the studding is 2 x 4 in.; the dormer rafters, 2 x 6 in., and the front porch rafters, 2 x 10 in., all 16 in. on centers.

The house is of balloon frame construction, with long diagonal braces at the corners. All floors are stiffened with continuous rows of double herringbone 2 x 4-in. bridging spaced 10 in. on centers.

The outside framing is covered with diagonal sheathing on which is placed heavy building paper. This in turn, up to the second story, is covered with novelty siding. The walls and roof above this point are covered with white cedar shingles, laid in regular courses 5½ in. to the weather.

The finished floors are of 7 x 2½ in., tongued and grooved maple. The interior trim is chestnut, except in the case of the bath room, which is constructed with a wainscot of composition cement, extending to a point 4 ft. 6 in. above the floor. A tile base and cove finishes the junction with the floor.

All rooms are plastered and the walls of those on the first floor, except kitchen and pantry, were treated to two coats with a sand finish. The bed rooms on the second floor have a sand finish natural, but all closets and the bath room are given a hard white finish.

The Color Scheme

The color scheme for the exterior painting of the house suggested by the architect is as follows: all exterior walls on the first floor, three coats of the best pearl gray; shingles of vertical walls above the first story, light brown; roof shingles, dipped and stained a light Nile green; all trim on exposed surfaces on high lights, three coats of white paint, with a darker shade in all panels or backgrounds.

The house is piped for gas and wired for electricity and combination gas and electric fixtures are supplied as follows: dining and living room, drop pendants of four lights each; hall, a lamp of two lights; porch, one light above entrance door; bed rooms, wall brackets, the two front bed rooms also provided with ceiling drops.

Heat is supplied by a hot-water heating plant of the "Ideal" type, with radiators in all rooms of sufficient area to insure a temperature of 70 deg. in zero weather.

Plumbing fixtures are of enameled iron with nickelplated fittings on bath room fixtures and brass faucets in the kitchen.

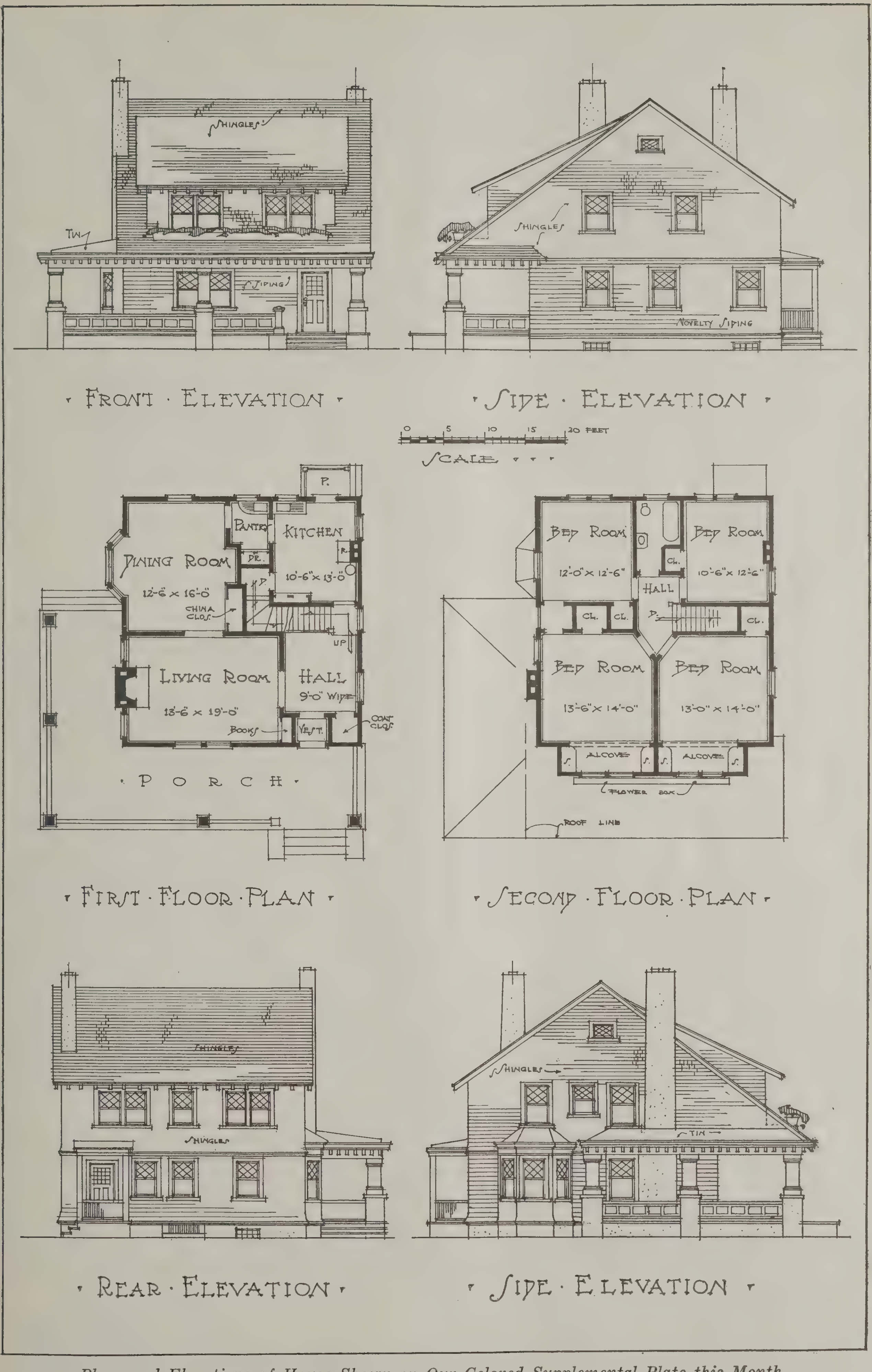
An Estimate of Cost

Following is an estimate of the different cost items in the construction of the house here described:

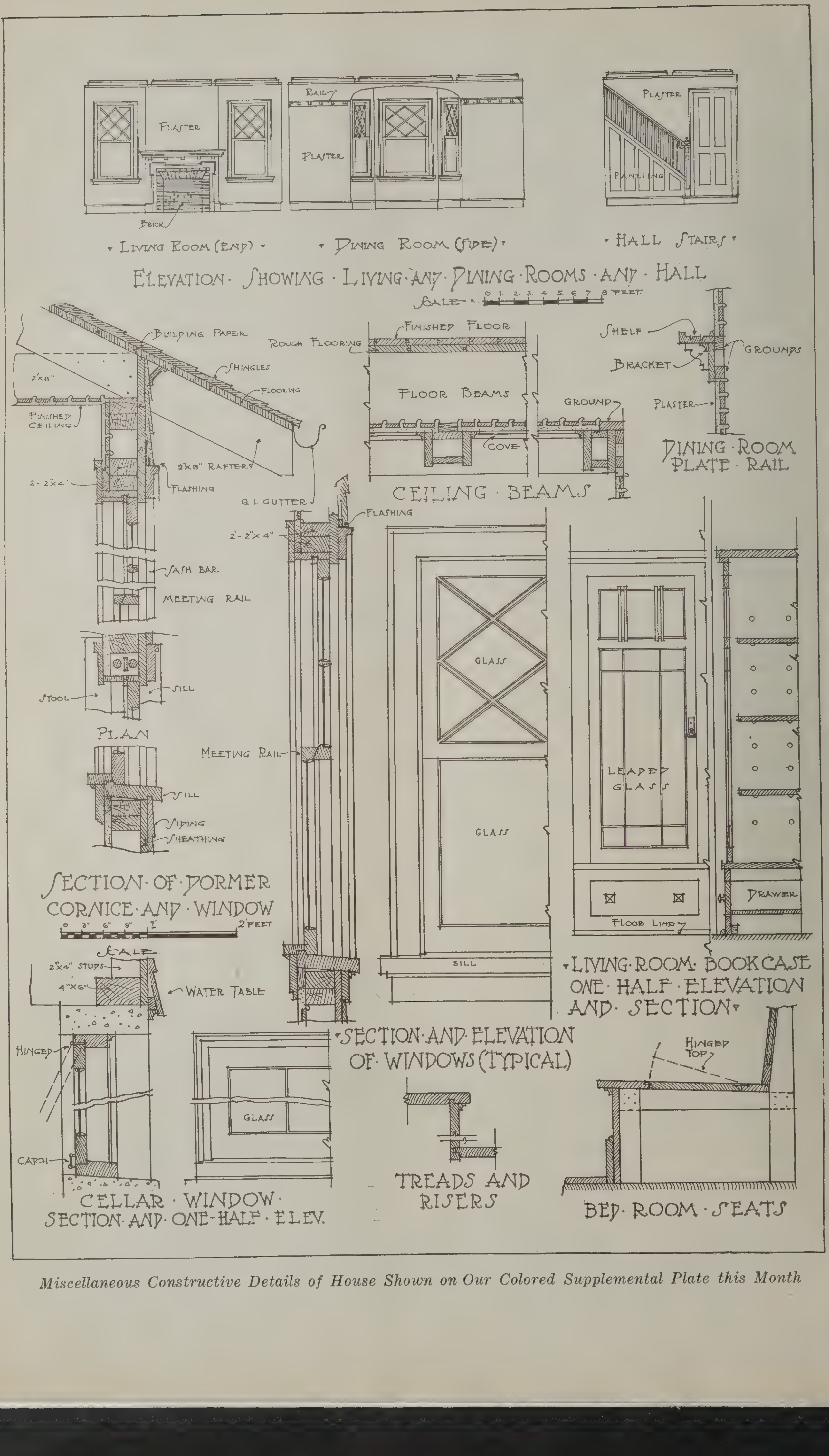
Grading	$60.00
Excavating	125.00
Masonry	820
Concrete and cement work	194.00
Plastering	340.80
Carpentry and mill work	1,870.00
Painting	280.00
Plumbing	385.60
Heating	380.00
Metal work	198.00
Tile	45.00
Mantel	50.00
Gas and electricity work	219.00
Hardware	60.00
Total	$5,027.40

The total cost price as given in the detailed estimate is figured on the basis of 26,460 cu. ft. as the cubical contents of the house, with a unit figure of 19 cents per cubic foot.

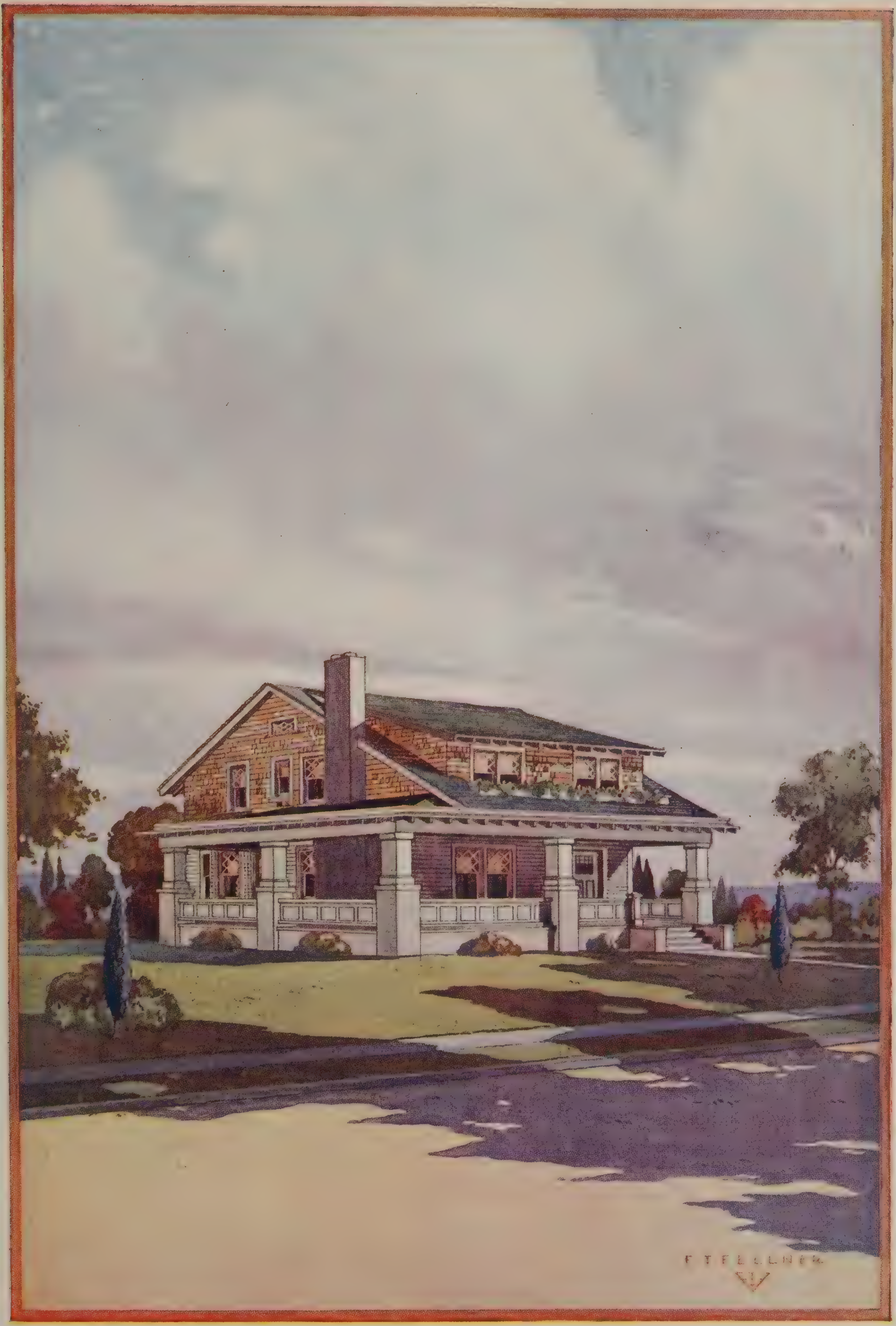
The house was designed and the plans prepared by Frank T. Fellner, architect, care of *The Building Age*, or 413 Caton avenue, Brooklyn, N. Y.



Plans and Elevations of House Shown on Our Colored Supplemental Plate this Month



Miscellaneous Constructive Details of House Shown on Our Colored Supplemental Plate this Month



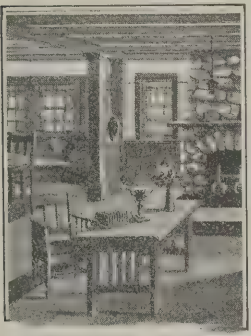
BUILDING AGE
NEW YORK

Suggestions for Interior Decorations

Some Comments Touching the Color Scheme and Furnishings of House Shown on Colored Supplement

By Anna L. Moffatt

THE colored supplement plate in this issue shows a charming house of unusual style. The interior is most conveniently arranged, having some very attractive features, notably the panelled staircase, the fireplace so gracefully simple in design and the bookcase. The interior woodwork is chestnut, which will take a soft brown stain, which I would suggest for the first floor. The floors, which are maple, I would finish about two shades darker than natural.



For the wall space in the hall and living room I have in mind a gray paper having a 4-in. stripe in green and self-color. This is one of the new papers and sells for $1.35 for 30-in. roll. On the floor I would place a sage green rug in 9 x 12 size, using a smaller one for hearth rug.

The furniture here should be informal in character. In front of the fireplace a large, overstuffed Davenport done in dull rose will be excellent. Directly back of this a gate-legged table will be useful for reading lamp, which may have a shade in rose coloring. On the right of the door entering from the hall I would place a piano or large table. A willow chair stained gray-green, with cushions in dull rose. A winged rocker will look well near the window. One small chair and a fern stand may be placed near the piano.

The curtains here, as in hall and dining room, may be of cream net with narrow lace edge. I would have dull rose portieres at the doors. These should be made of double face velour. The effect obtained will be a comfortable room with harmonious coloring.

The Dining Room

The walls of the dining room I would cover with old blue paper, having a diamond pattern in self-color. The windows here are so well placed there is sure to be the right light, and light is an important factor when selecting a wall covering for the dining room. Here, we have not the color note that is usual in other rooms of the house. A rug, having an all-over pattern, will be excellent. For the furniture, nothing could be better than oak. A small buffet may be placed in the recess. The other furniture would include a round dining-table and side table with the chairs to be done in old blue tapestry having small figure in self-tone. The portiers may be light tan. On the plate rail, the various colored pieces will help the decorative scheme wonderfully, and will complete a dining room of simple elegance.

In planning the second floor, the architect has utilized every inch of space most advantageously, there being no unnecessary detail. Here the woodwork has been given a white enamel treatment. The floors have been filled a shade just off natural. To maintain harmony where the rooms are so closely related, I would suggest covering the walls of all the bedrooms with a pale gray paper, having a narrow stripe or dark in self-color.

A distinctive color scheme may be obtained, however, by using a narrow border for panelling the wall spaces.

The Bedrooms

For bedroom No. 1, I would suggest a lavender color scheme, using a narrow pansy border; at the windows I would hang plain scrim curtains having narrow lace edge. There may be over hangings of lavender cotton rep. A light green rug with maple furniture will give an extremely dainty room.

For bedroom No. 2, I would use a narrow striped border in two shades of rose. On the floor I would place several small Scotch rugs, light rose in color. I would hang pink flowered cretonne at the windows and with magohany furniture the effect will be a handsome room and one that will wear well.

The adjoining room I would do in blue, using a cretonne to match border for over hangings. With blue cretonne rug and white enamel furniture, I can't imagine a more exquisitely dainty room.

For the guest room I would use a narrow border of yellow pansies shading to light brown. The over hangings I would make of light brown Holland. On the floor space I would place several brown cretonne rugs in appropriate sizes. A brass or white enamel bed will look well. A chest of drawers in cherry or mahogany, with table dresser having glass top and valence of brown Holland, will complete a quaint, restful room, suggesting an old picture.

What "Life" Says on the Subject of Houses

In a recent issue of *Life*, the well-known humorous weekly, there appeared the following remarks on the subject of "Houses." which are so characteristic of the semi-satirical point of view of that publication that we present them herewith:

"Houses are used to dot landscapes with, to pay taxes upon (if you can scrape enough money together), and to keep rainstorms, cyclones, hurricanes, mosquitoes, book agents and callers from obtruding upon you too intimately.

"Houses are composed of lath and plaster, wood, nails and mortgages. A house without a mortgage is generally owned by a man without an auto. Some houses are made from cement, which is nothing but a species of glorified mud pie.

"All houses began originally as caves and were used by primitive man. The only difference between a primitive man and modern man is in the architect's fee.

"A house is built by contractors at the instigation of an architect, who begins by the statement that it will cost as much as he says it will. Every architect to be successful, therefore, must have two accomplishments—he must be an architect and an accomplished liar.

"Houses have roofs over them to keep out the water and cellars below them to keep it in. They are usually filled with furniture, women's hats, people and unpaid bills. Sometimes they also contain servants and suffragettes—but never together."

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Architectural League of New York

According to the circular of information recently issued by the secretary, the twenty-ninth annual exhibition of the Architectural League of New York will be held in the building of the American Fine Arts Society, 215 West 57th Street, New York City, February 8 to February 28, inclusive, 1914. The league reception will occur on the evening of February 7 and the annual dinner will occur on the evening of February 6.

The exhibition will be illustrative of architecture and the allied fine arts and will consist of drawings and models of proposed or executed work in structural, decorative and landscape architecture; sketches and finished examples of decorative painting; sketches, models and finished examples of decorative and monumental sculpture; drawings and models of works in the decorative arts and photographs of executed work in any of the branches above mentioned.

The New York Chapter of the American Institute of Architects has established a medal of honor for award to designers of buildings represented in the annual exhibition of the league, and there has also been established by the league medals of honor to be awarded to mural painters and to sculptors represented in this annual exhibition.

Competitions will be held under the auspices of the Architectural League for the Henry O. Avery prize for sculpture and a special prize of $300 will be given for the best design submitted by an architect, sculptor and mural painter in collaboration. The subject will be a gallery devoted to exhibits of ceramic art.

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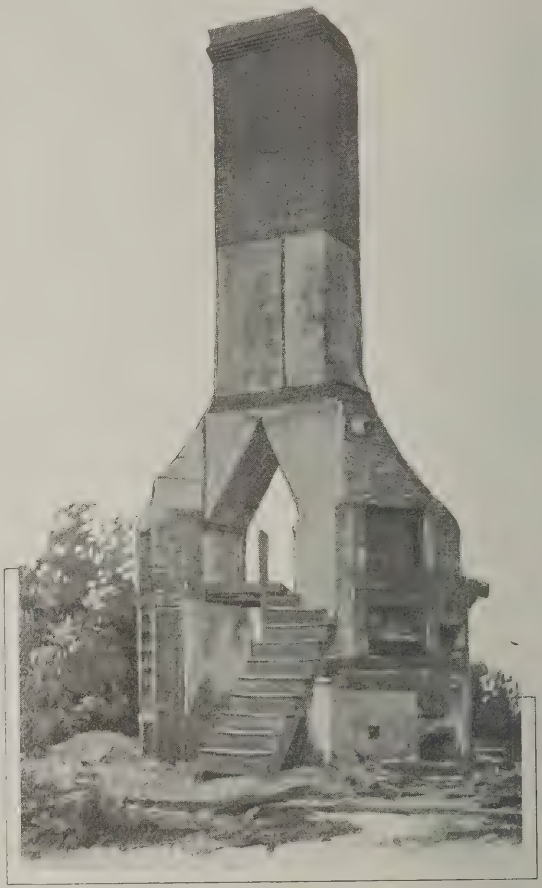
A Chimney of Revolutionary Days

In order to make way for the march of progress an old tavern or inn, as this sort of hostelry is sometimes called, was torn down at Kingston, R. I., disclosing the very interesting specimen of masonry chimney illustrated in the accompanying engraving. As will be seen, the chimney is divided in its lower part into two sections, thus providing fireplaces in both wings of the house. The space between the sections was utilized for stairways, while in the right hand section was a typical New England Dutch oven, in which all the baking was done. The chimney shows to unusual advantage the intricate design and execution of a now obsolete type of masonry.

One can readily understand how this great mass of brickwork in the center of a dwelling would store up when thoroughly heated by its many fireplaces an immense quantity of heat and act as a radiator, keeping the house comfortably warm throughout the winter nights.

Aside from its interest as a specimen of bygone architecture there are some rather exciting tales connected with the old tavern. In the stormy Revolutionary days it was a widely known and famous gathering place, and its reputation not always of the best. A gang of counterfeiters once made it their headquarters, and when at last they were forced to flee from the officers of the law, friendly villagers aided them to escape into the west, which at that time meant New York State. According to *Popular Mechanics Magazine*, to which we are indebted for the photograph from which our illustration was made, a die for making Spanish dollars was found concealed in the timbers when the building was in process of demolition. Undoubtedly this was a relic of the episode in question.



A Chimney of Revolutionary Days

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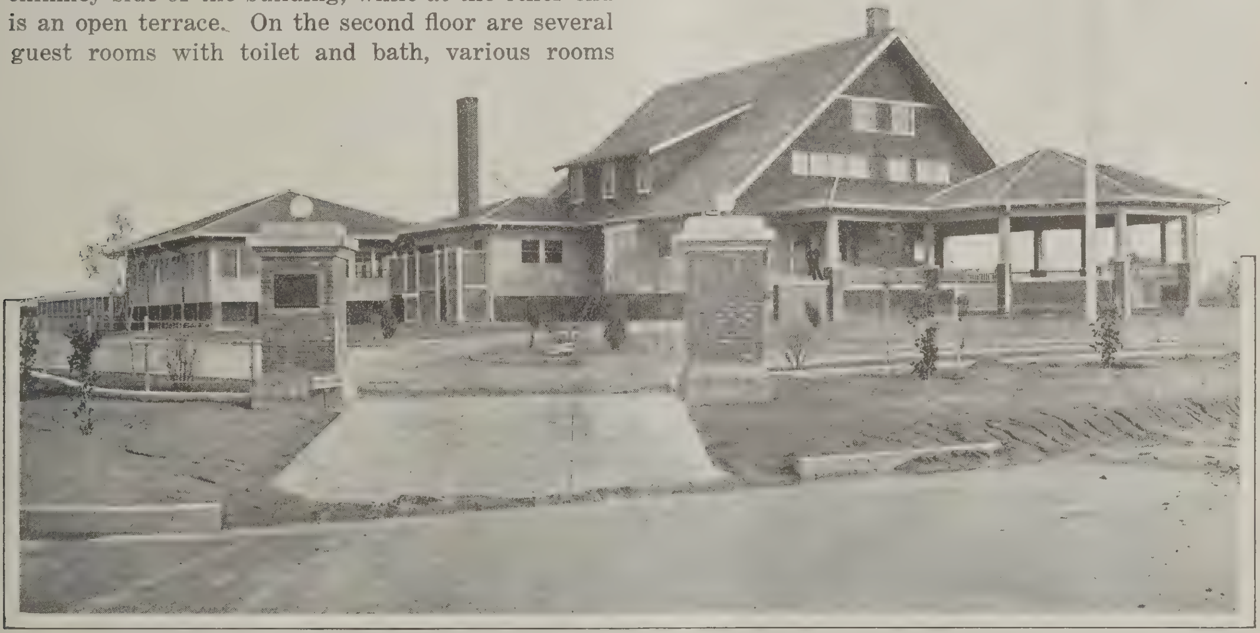
A rather uncommon sign has recently been built into a new concrete structure used as a garage at Clinton, Wis., the name of the motor company being cast in bold relief in the face of the building. Forms constructed on the ground with the letters reversed were lifted into place and the concrete poured during the construction of the masonry wall. There is no question as to the stability of the sign and it harmonizes in material and color with the lintels, sills and ornamental trim. This is one of the examples of the use of Universal Portland Cement contained in a recent issue of the Bulletin of the Universal Portland Cement Company.

Country Club House at Wichita, Kan.

Some Features of Design and Arrangement Which Will Strongly Appeal to the Progressive Architect and Builder

THE building which we illustrate upon this and the pages which follow is the new home just completed for the Country Club at Wichita, Kansas. The main part of the building is a two-story and attic affair with kitchen extension, the whole being surrounded with its golf links and tennis courts. The exterior treatment of the buildings is clearly indicated in the half-tone engraving, which represents a view looking toward the main gateway leading to the drives. An inspection of the plans show upon the main floor a living room, dining room, pantry, kitchen, reception hall, ladies' rest room and toilet rooms. At the right there is a screened dining room. A broad varanda extends across the front and partially around the chimney side of the building, while at the other end is an open terrace. On the second floor are several guest rooms with toilet and bath, various rooms for servants, a store room and a bath room.



A Country Club House at Wichita, Kan.—Front Entrance View Showing the Gateway Leading to the Drives—Henry S. Conrow, Architect, Wichita, Kan.

Communicating with the screened dining room is a dancing pavilion and at the right of this a swimming pool, the plans for both of which were drawn after the contract for the clubhouse proper had been awarded. The general layout of the various buildings with the surrounding golf links and tennis courts is indicated on the block plan shown on the following page.

The foundation walls to grade are of common hard burned brick, and above grade they are of dark red, round edge paving brick with deep sunk, dark brown mortar joints. The side walls above the foundation are covered with rough cast finish as far as the belt course, while above this the walls and roof are covered with Washington red cedar shingles laid 4½ in. to the weather. All shingles were dipped in Cabot's creosote stain of a dark moss green color before being laid.

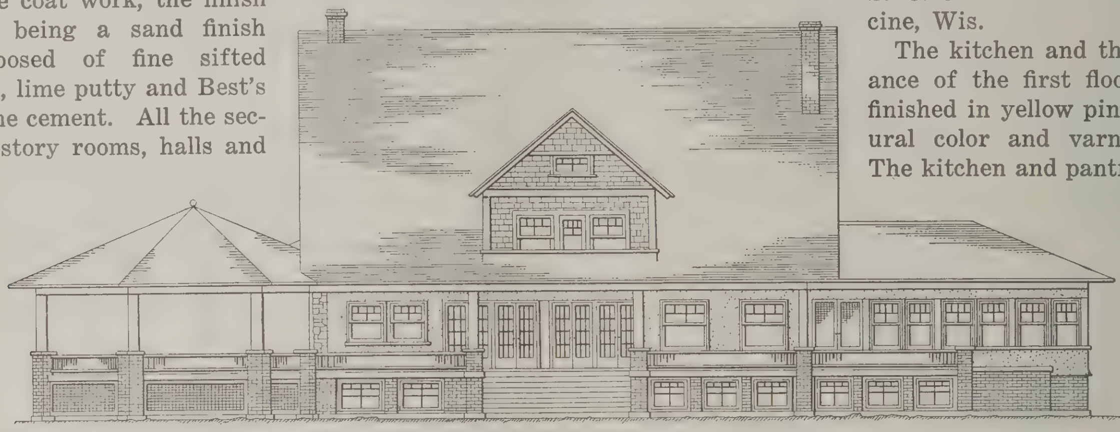
The entire basement has a cement floor 5 in. thick, on top of which is a finish coat consisting of 1 in. of cement and sand mixed in equal parts.

The outside finish is cypress and all timbers are yellow pine. All joist in the ceiling of the locker rooms, toilet and bath in the basement as well as living room, dining room, screened dining room and in the ceiling of veranda and *porte cochere* are exposed to form beam ceilings. The joist over the living room, dining room, front porch and screened dining room are double with a 2 x 4 between even with the beam and well spiked together. All joists resting on brick walls have 4 in. bearing on the wall, except on the outside walls, where they extend to support the plate under the studs. The latter have a plate top and bottom and there is also a plate on top of the ceiling joist to receive the rafters. All roofs except for the veranda are sheathed with 1 x 4 in. strips placed 16 in. on centers and nailed securely at every bearing.

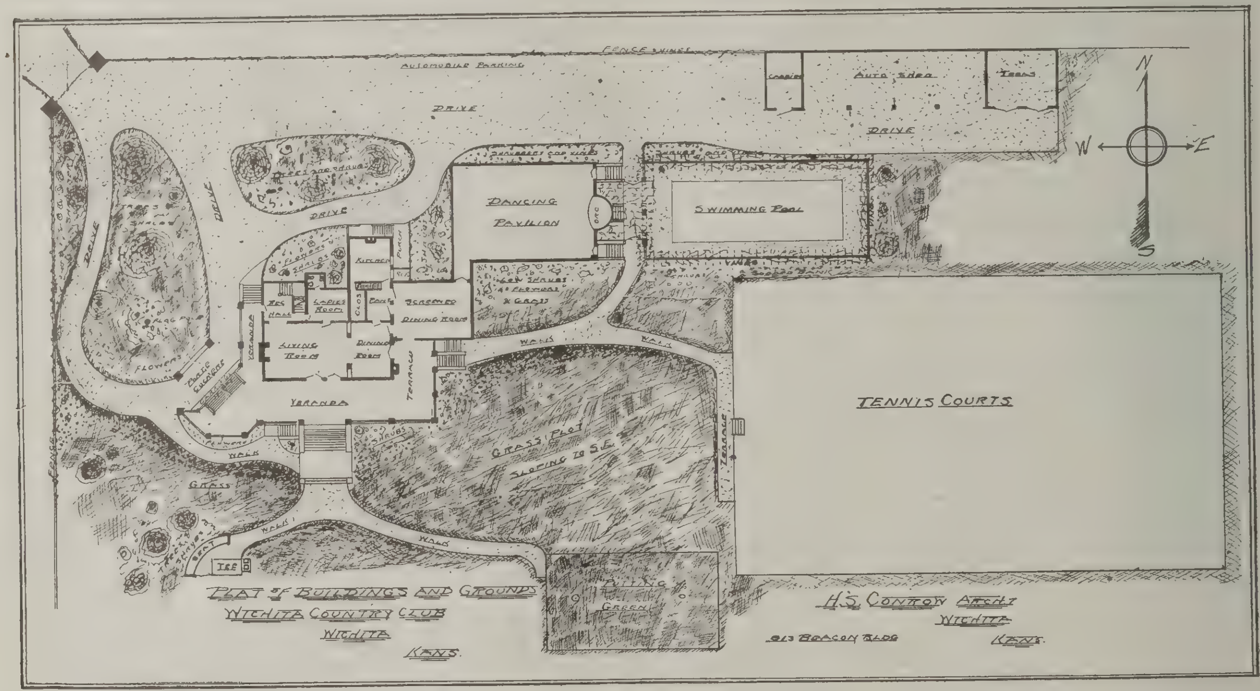
The entire outside of the frame, including the gables and dormer, are sheathed with ⅞ x 8 in. shiplap boards. Over this, except on the roofs, is a layer of Neponset black waterproof paper made by Bird & Son, East Walpole, Mass., all being well secured in place and all joints lapping 3 in. The sheathing paper also underlaps all casings, cornices, etc. Below the belt course, where shown, furring strips were nailed over the sheathing paper, and to these strips was stapled perforated metal lath, to which was applied, according to the manufacturers' directions, United States Gypsum Company's stucco finish.

The balcony floor is of yellow pine well painted and covered with "Duxbac" asphalt roofing, canvas covered, and laid in wet paint. After laying, the canvas top roof was given three coats of white lead and oil.

All walls and partitions of the rooms on the first floor in the main part of the building are plastered three coat work, the finish coat being a sand finish composed of fine sifted sand, lime putty and Best's Keene cement. All the second story rooms, halls and closets as well as kitchen pantry and cellar-way are also plastered three coat work, the last coat being a white coat of plaster-of-paris and lime putty.



Front Elevation of Club House—Scale 3/64 In. to the Foot



Block Plan Showing Relative Position of the Various Buildings, Golf Links, Tennis Courts, Etc.

A Country Club House at Wichita, Kan.

All doors except those having glass panels are of the five cross panel type, and the glass doors have two cross panels below the light.

The living room, reception hall, dining room and ladies' rest room on the main floor are finished in red oak, stained "Early English" and waxed. The walls are tinted on a sand finish plaster. The screened dining room is finished in a deep ivory paint with a lattice of narrow strips on the walls, the whole being tinted a dull green on sand finish plaster. This room has storm windows for cold and inclement weather, so that when not in use they can be raised or put out of the way.

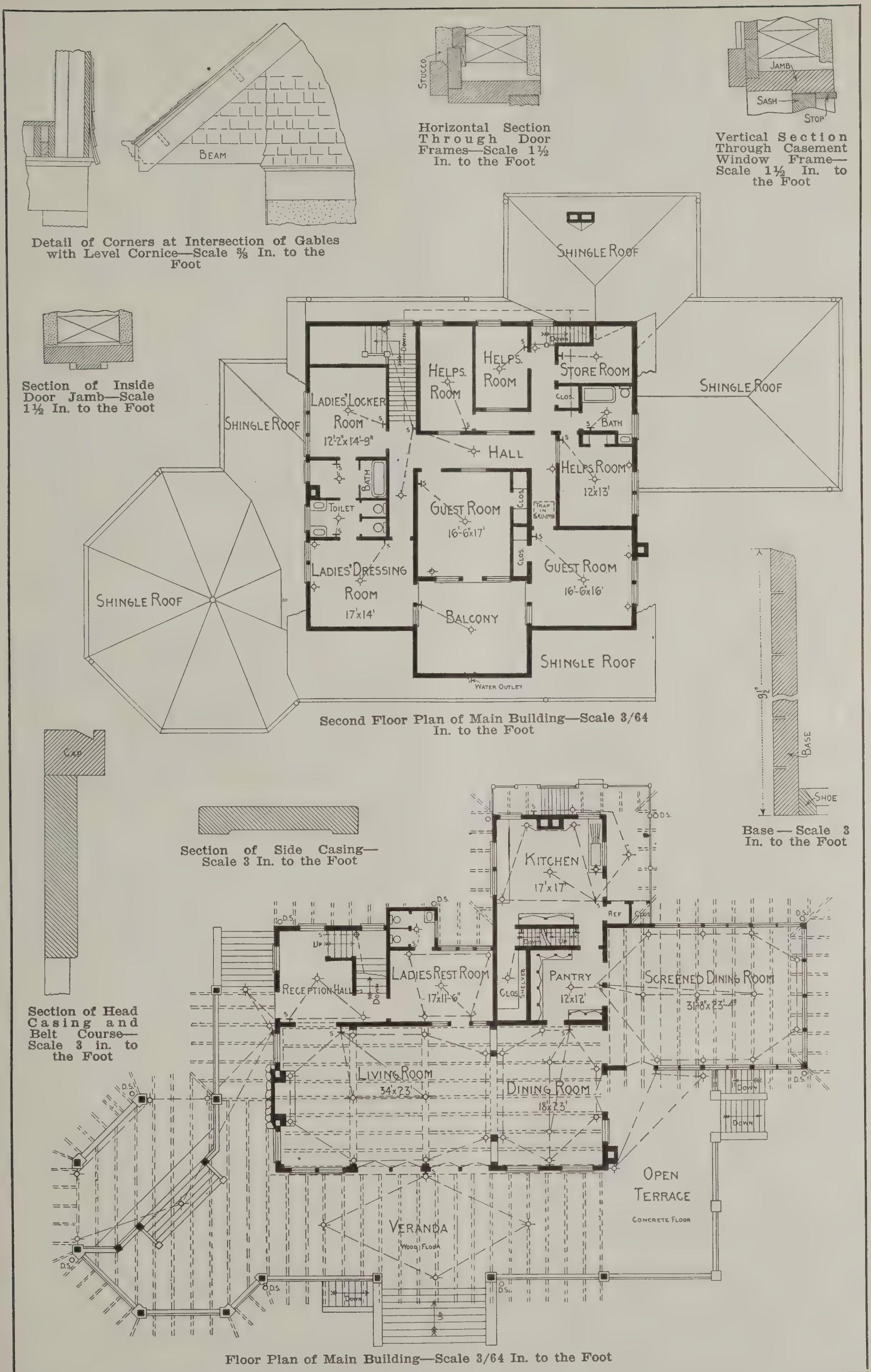
The northeast corner of the screened dining room is connected with the dancing pavilion, which was built later, and while not shown on the main floor plan it will be found on the block plan on the second page of this article.

All yellow pine woodwork, doors and all exposed ceiling beams as well as ceilings were given one coat of Johnson's wood dye, and over this was applied one coat of Johnson's prepared wax made by S. C. Johnson & Son, Racine, Wis.

The kitchen and the balance of the first floor are finished in yellow pine natural color and varnished. The kitchen and pantry are fitted up with cupboards, sinks, drain boards, etc., all as indicated. There is also space for a refrigerator which can be iced from the outside, thus avoiding the necessity of passing through the kitchen. All the rooms on the second floor are finished in yellow pine, stained and waxed. The attic is not finished.

In the basement under the main portion of this building are the men's lounging room, locker room, men's toilet and dressing rooms, shower baths, boiler room, store room, etc.

Under the dancing pavilion are also dressing



Detail of Corners at Intersection of Gables with Level Cornice—Scale ⅜ In. to the Foot

Horizontal Section Through Door Frames—Scale 1½ In. to the Foot

Vertical Section Through Casement Window Frame—Scale 1½ In. to the Foot

Section of Inside Door Jamb—Scale 1½ In. to the Foot

Second Floor Plan of Main Building—Scale 3/64 In. to the Foot

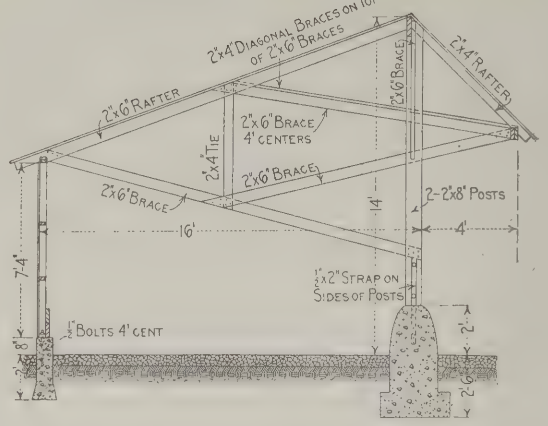
Base—Scale 3 In. to the Foot

Section of Side Casing—Scale 3 In. to the Foot

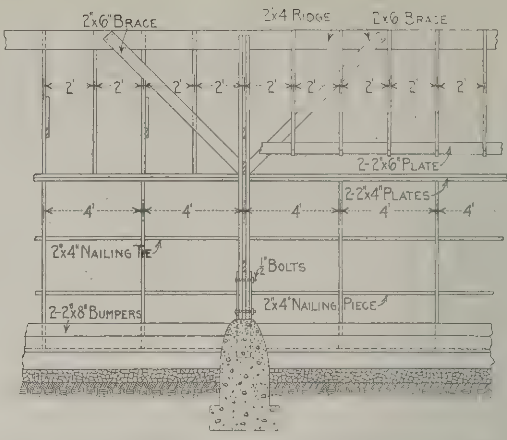
Section of Head Casing and Belt Course—Scale 3 in. to the Foot

Floor Plan of Main Building—Scale 3/64 In. to the Foot

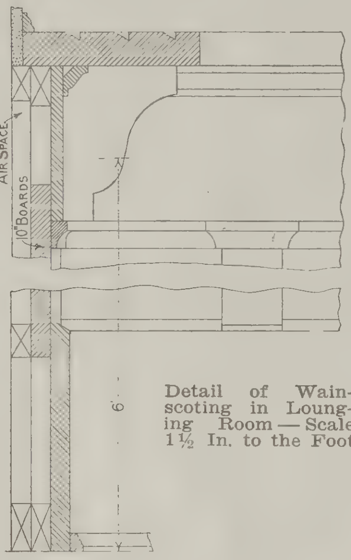
A Country Club House at Wichita, Kan.—Plans and Miscellaneous Details



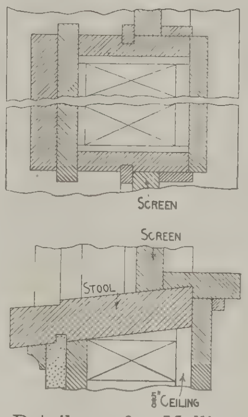
Cross Section of Framing of Caddy House and Garage—Scale 1/8 In. to the Foot



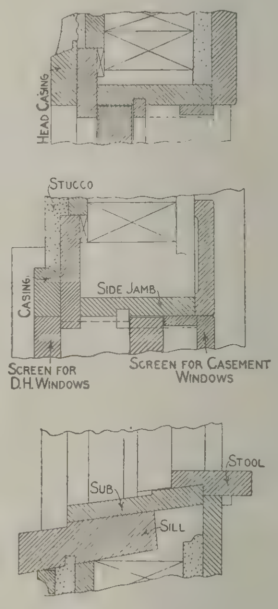
Longitudinal Section of Framing of Caddy House and Garage—Scale 1/8 In. to the Foot



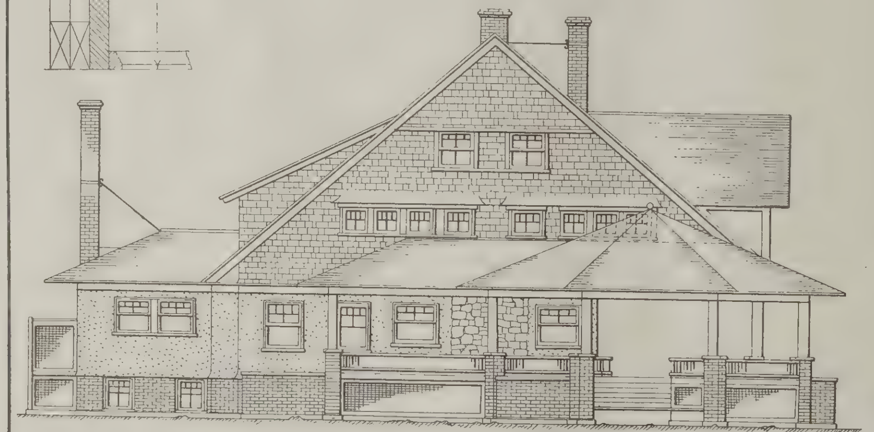
Detail of Wainscoting in Lounging Room—Scale 1½ In. to the Foot



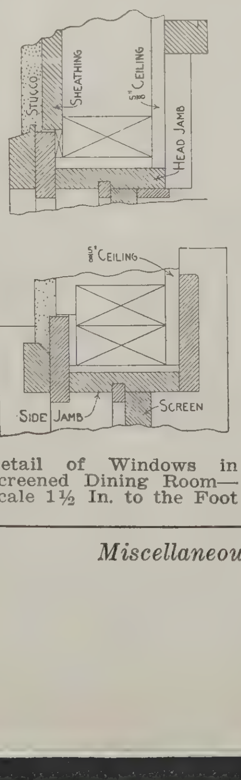
Details of Mullion Windows—Scale 1½ In. to the Foot



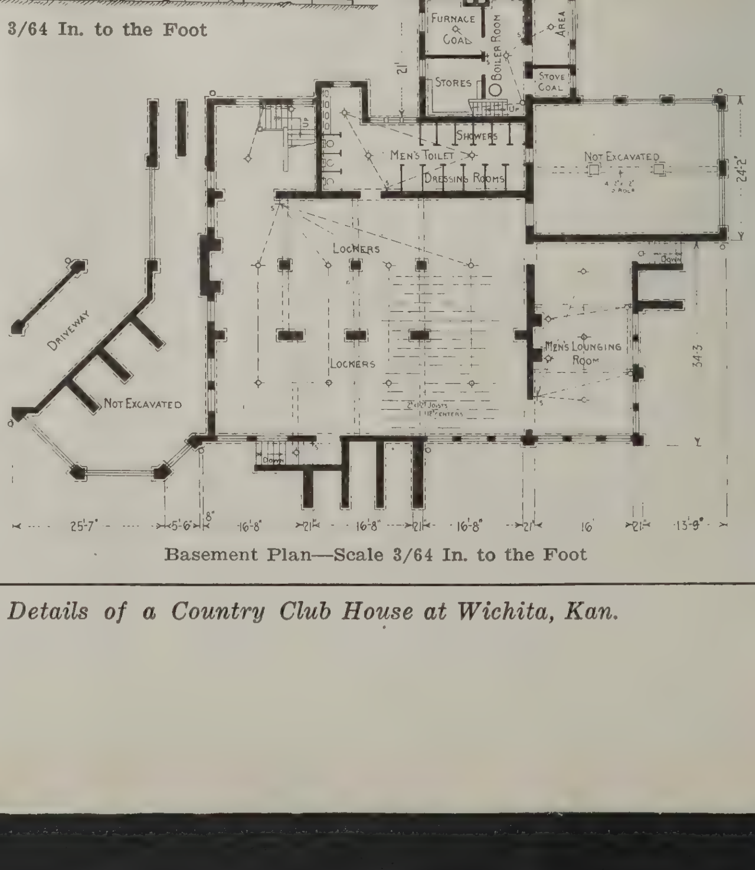
Details of First Story Windows—Scale 1½ In. to the Foot



Side (Left) Elevation—Scale 3/64 In. to the Foot



Detail of Windows in Screened Dining Room—Scale 1½ In. to the Foot



Basement Plan—Scale 3/64 In. to the Foot

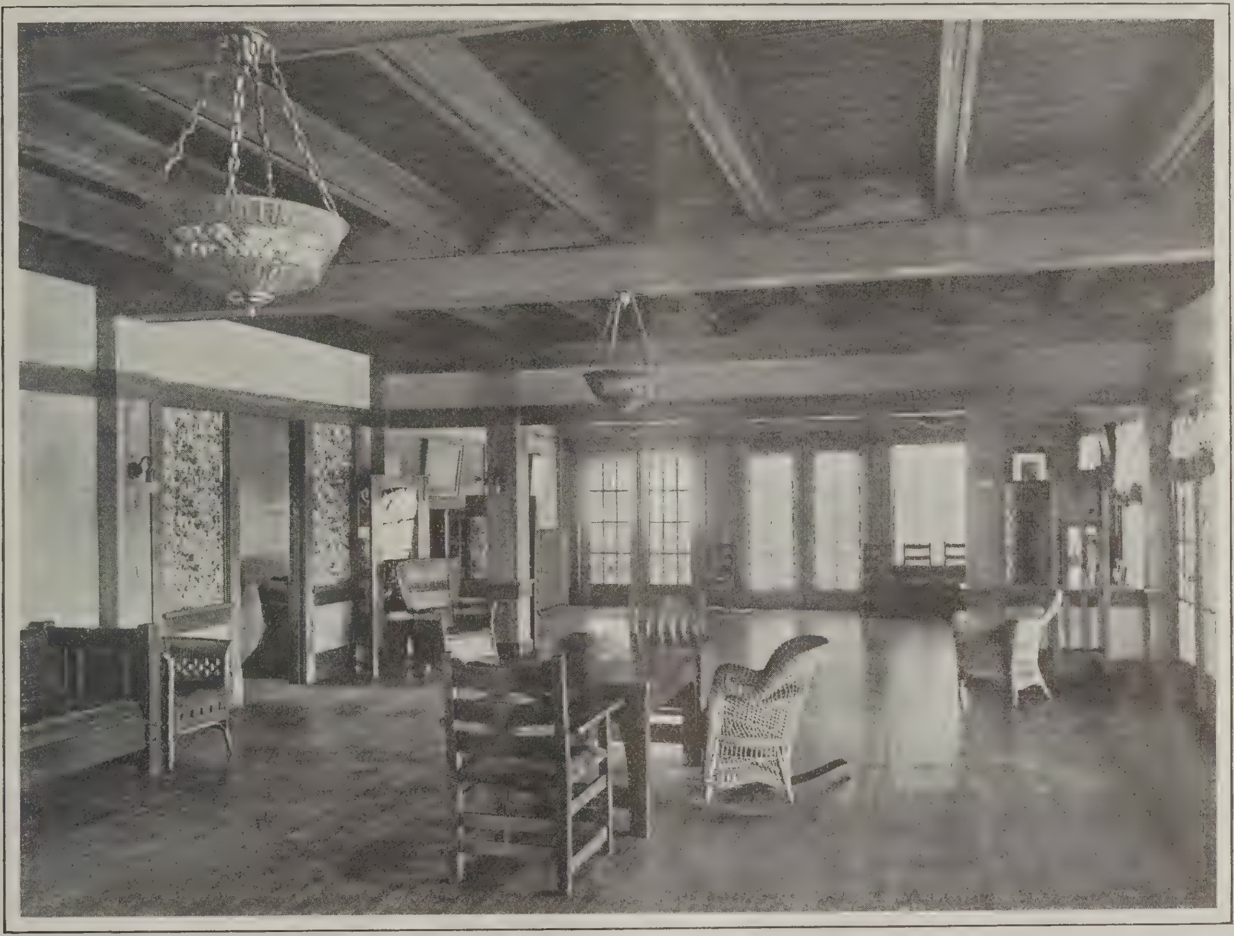
Miscellaneous Constructive Details of a Country Club House at Wichita, Kan.

rooms for men and women, together with shower baths, toilets, etc. In the dressing room for the women the lockers are 12 in. wide, 18 in. deep and 15 in. high set up 6 in. from the floor, while the men's lockers are 12 in. wide, 12 in. deep and 12 in. high. The locker rooms, shower baths, toilets, etc., have concrete floors and the finish is in yellow pine stained and waxed, except the toilet and shower rooms which are painted white. The shower baths have slate partitions with nickel-plated fittings and railings, with tile floors and back, and supplied with hot and cold water through non-scalding valves. In the locker rooms are about 200 metal lockers with perforated sides and doors and having cylinder locks.

All the exterior woodwork is painted a light straw color, which with the dark red of the foundation brick and the gray of the stone cappings, steps and stucco finish of the first story combine to give with the dark moss green of the second story and roofs a most impressive effect.

The fireplace in the living room is of red Oklahoma granite and fitted with a heavy mantel shelf of wood to match the trim of the room. The fireplace is fitted with large gas logs for natural gas.

The heating of the building is done with coal, but the range and the water heater as well as the fireplace use natural gas as fuel. The lighting of the building as well as the entrance gate posts and the grounds is by means of electricity, use being made of both direct and indirect lights. The location of the various switches and electric light fixtures is clearly indicated on the floor plans.



A Country Club House at Wichita, Kan.—View in Living Room Looking Toward the Dining Room and Showing in the Distance the Doors Leading to the Open Terrace

In the cellar is a 300 gallon Pittsburgh iron tank fitted with automatic connection with a No. 400 Pittsburgh multi-coil storage heater, using $2\frac{1}{2}$ in. brass pipe as circulators between heater and boiler with $2\frac{1}{2}$ gate valves and elbows, the system being fitted up in accordance with the directions of the maker, the Pittsburgh Water Heater Company.

The plumbing fixtures are of the open type with nickel-plated fittings, the plumbing and heating being done by the City Heating & Plumbing Company, Wichita, Kansas, and the material and fixtures furnished by the Crane Company, Chicago, and J. M. Kohler Sons Company, Sheboygan, Wis.

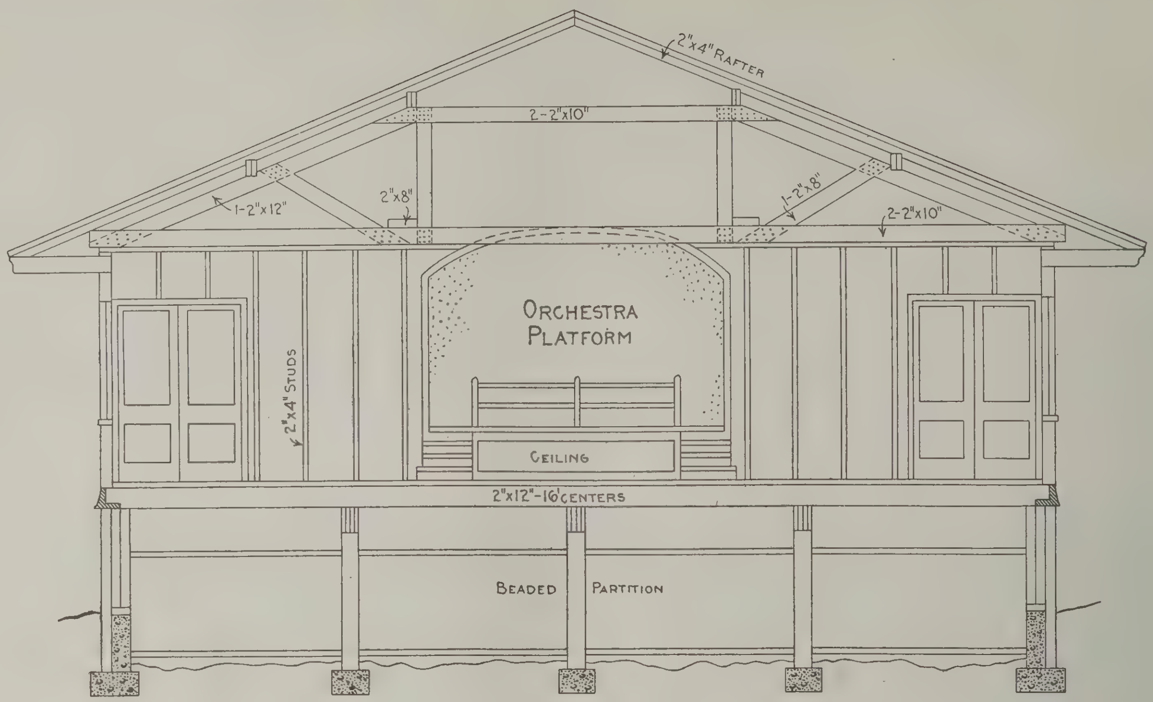
The entire building is heated by an Ideal steam boiler made by the American Radiator Company, Chicago, Ill., and having a rated capacity of 1900 sq. ft. direct radiation. The heating plant is equipped with a Honeywell generator.

The rear basement wall is fitted with two Majestic Coal chutes made by Majestic Furnace & Foundry Co., 156 Erie street, Huntington, Ind.

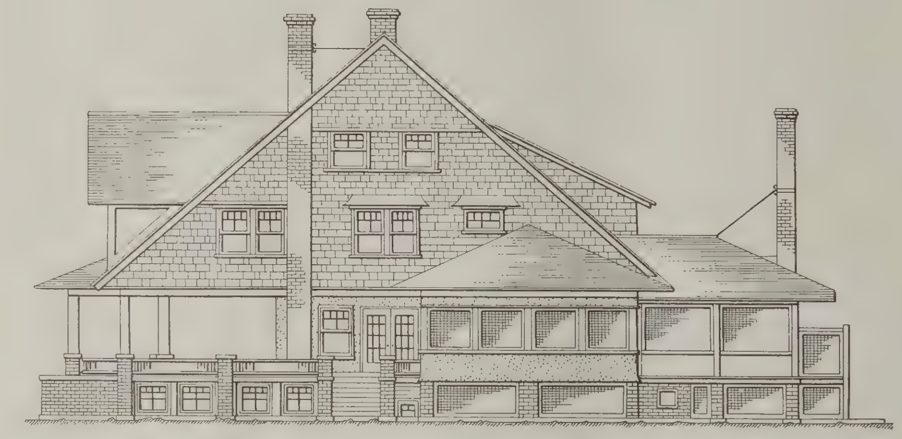
The general contractors were the Hammond Construction Company, who had the contract for the entire work. The stains and varnishes used were those of the Standard Varnish Company. The mill work was furnished by the Western Planing Mill Company, and the lumber and flooring by the Titus-Higley Lumber Company.

The Country Club house here described was erected in accordance with plans prepared by Henry S. Conrow, registered architect, 813 Beacon Building, Wichita, Kan.

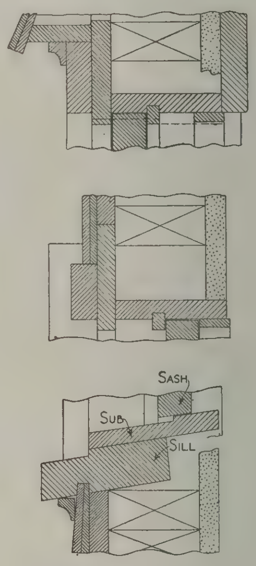
The swimming pool built in connection with the



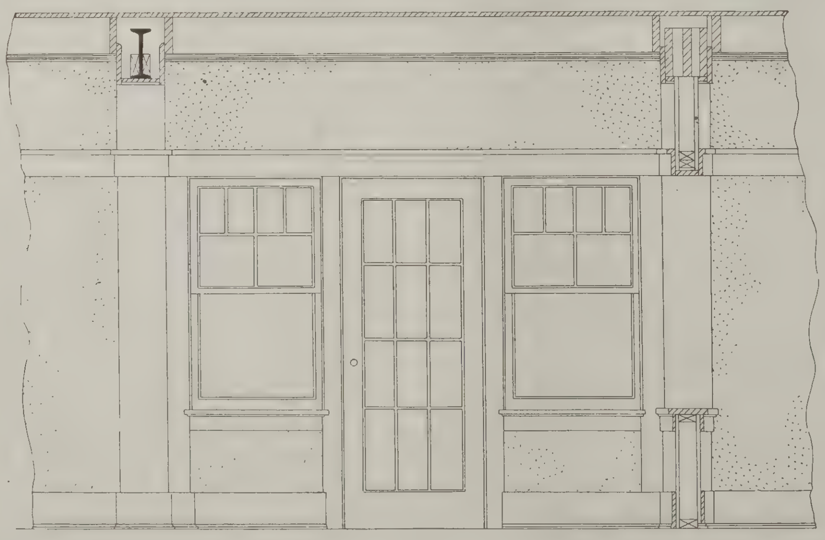
Vertical Cross Section Through the Dancing Pavilion Looking Toward the Orchestra Platform—Scale ⅛ In. to the Foot



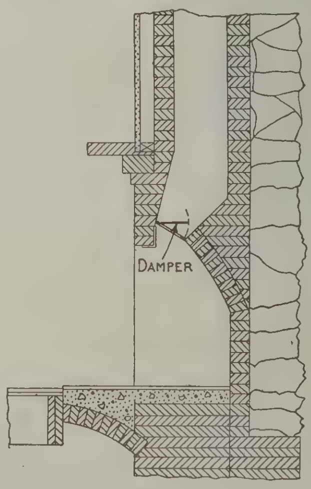
Side (Right) Elevation Showing the Screened Dining Room—Scale 3/64 In. to the Foot



Details of Second Story Windows—Scale 1½ In. to the Foot



Partial Elevation of North Side of Living Room—Scale ¼ In. to the Foot



Section Through Fire Place in Living Room—Scale ¼ In. to the Foot

Miscellaneous Constructive Details of a Country Club House at Wichita, Kan.

club house together with the dancing pavilion will form the basis of an article to appear in a subsequent issue.

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Finishing Birch to Resemble Mahogany

The occasion not infrequently arises where it is desirable to finish birch in a way to resemble mahogany and the following method given in a recent issue of *The Painters' Magazine* in reply to a correspondent of that journal who raised the question, may not be without interest to some of our readers:

Birch, especially the black variety, will, when properly stained, make a very fine imitation of black walnut or mahogany, being of fine grain. By manipulation of several stains feathered mahogany can be closely imitated on birch. It is first stained and may be filled with mahogany colored paste filler afterward, which will bring out the details with better effect. On top of this filler two coats of shellac varnish, when sand-papered, will give an excellent surface for polishing.

As birch has almost the color of cherry wood, a very strong stain is hardly necessary, but for work that is to be filled and shellac varnished and afterward polished, we would suggest the use of a rather fast drying oil stain, made from burnt sienna and rose pink, both ground fine in oil.

Twelve ounces burnt sienna in oil and eight ounces rose pink or maroon lake in oil, beaten up with one quart liquid drier or japan, to which is added one pint of good inside varnish and one-half gallon of turpentine, will make one gallon of mahogany stain that will dry reasonably quick and should serve an excellent purpose.

A Country Club House at Wichita, Kan.—View in Living Room Looking Toward Open Fireplace

Model Homes of Five Rooms Each

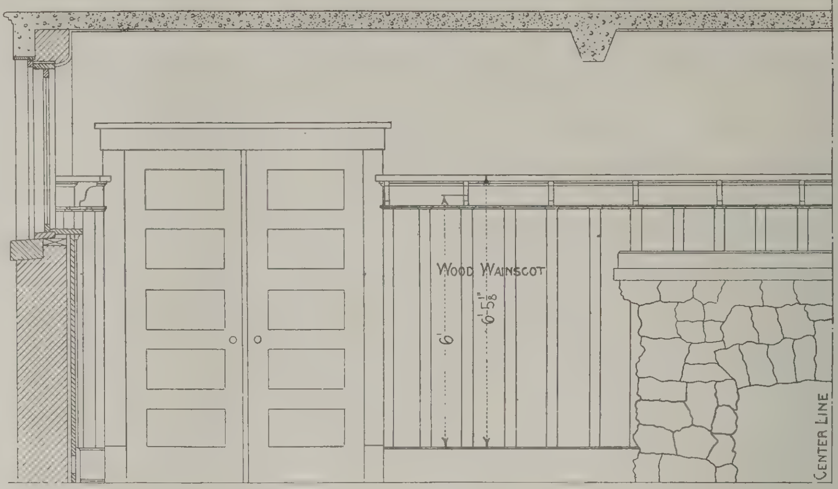
Some rather interesting statistics showing the wide demand for small apartments have just been compiled from the figures of the Tenement House Department by Thomas F. Malone, who has had five years' service with the Department in question. He is preparing to erect model houses of five rooms which will afford all the conveniences of an apartment of that size and at a much less annual rate.

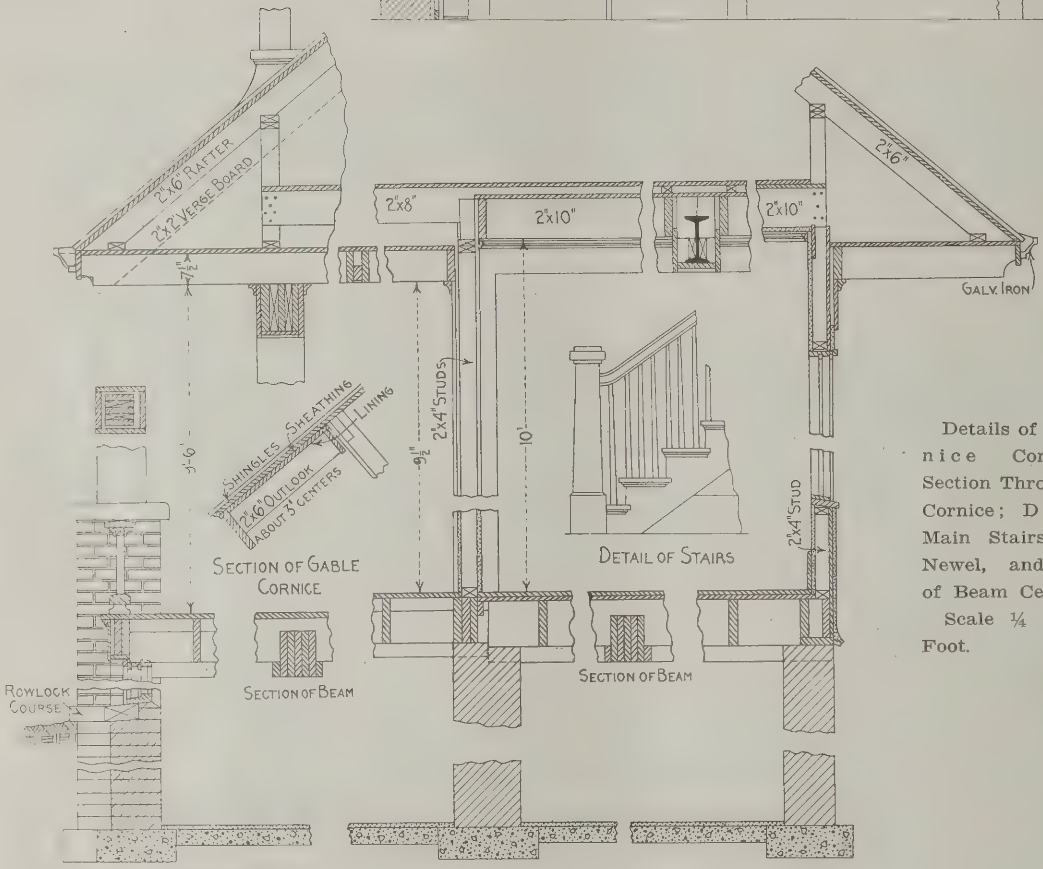
In the year 1910 the records of the Tenement House Department, says Mr. Malone, show that in New York plans were filed for 1,946 new tenement houses to contain 29,399 apartments. Of these apartments 19,773, or 67½ per cent., consisted of four and five room suites. In the year 1911 plans were filed for 1,743 tenements, to contain 24,920 apartments, of which 16,789, or 67½ per cent., were four and five rooms each.

This shows, he points out, that the great demand is for small apartments, and as these four and five room apartments rent from $15 to $20 monthly, it naturally is to be assumed that 67½ per cent. of the people who occupy these tenements cannot pay more than the cost of four and five room apartments. Compare this with the suburban situation and it will readily be seen why congestion continues in the over-crowded district.

The model five-room houses which Mr. Malone intends to erect will occupy a lot 25 x 100 ft. and will be equipped with all the modern improvements. The cost of the house is placed at $1,650 and the cost of the lot $500, making a total of $2,150, which is to be paid as follows: Cash when the house is completed and the deed given $100, first mortgage $1,500, second mortgage $550.

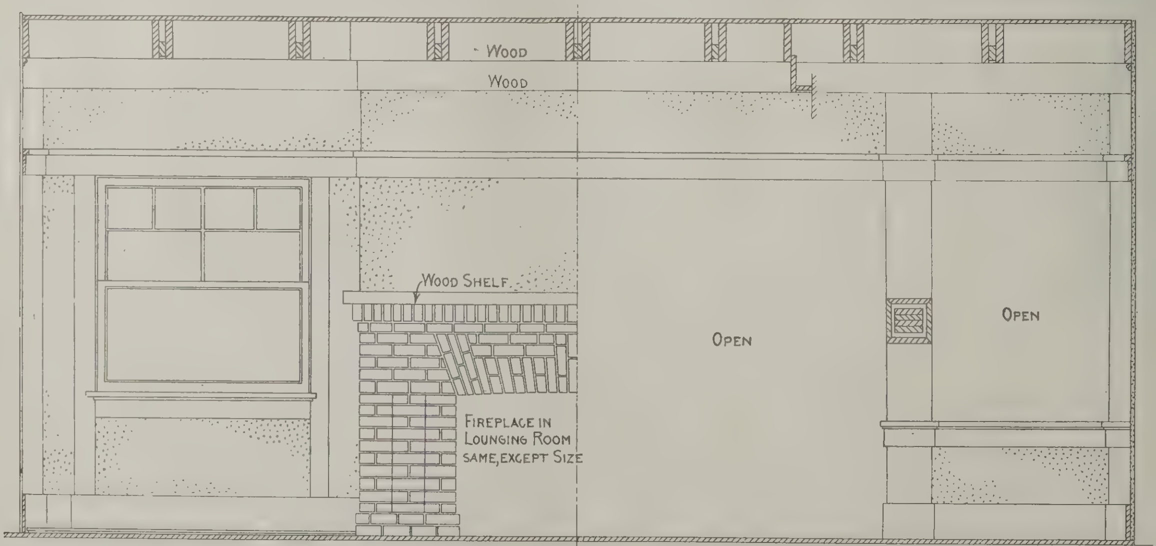
Elevation of West Side of Lounging Room in Basement of Main Building Showing Trim and Wainscoting.
Scale ¼ In. to the Foot.





Details of Main Cornice Construction; Section Through Gable Cornice; Detail of Main Stairs Showing Newel, and Sections of Beam Ceilings.
Scale ¼ In. to the Foot.

Section of Porch Section Through Front Wall Section Through Main Wall



One-Half of West Elevation of Living Room—Scale ¼ In. to the Foot

One-Half of East Elevation of Living Room—Scale ¼ In. to the Foot

Miscellaneous Constructive Details of a Country Club House at Wichita, Kan.

Where Builder and Architect Disagree

Suggested Changes in Various Clauses of the "Uniform Contract"—Decision of Architect Should Not Be Final

By John A. Kelley*

THERE are only a few instances in which contractors and architects are at variance in reference to building contracts and to General Conditions in specifications. Considering the immense scope of building operations in this country it is surprising to note the uniformity of practice, and now that the Builders' Exchanges of the country, locally and through the National Association, have started a movement to eliminate those features that are objectionable, it is likely that the next few years will see a satisfactory uniform building contract and also less drastic General Conditions in specifications.

We have had a conference committee of the Builders' Exchange in Columbus, which for many months past, has been working on the changes that builders think necessary, this committee being of the opinion that the arbitration clause of the Uniform Contract should be extended throughout the contract and that in no case shall the "decision of the architect or engineer be final," but that it should be left to arbitration or to the courts. This is perhaps the most objectionable feature of contracts or General Conditions. Many hardships have been worked under the clause that the "decision of the architect shall be final and binding in questions of workmanship, materials or quality."

Undesirable Clause in "General Conditions"

It is also believed that the clause in General Conditions, which states in effect that any omissions or errors in the plans and specifications shall be rectified by the contractor and that he shall be held liable for them, should be stricken out. The mistakes or omissions of an architect should not fall upon the contractor, but should go naturally to the owner. The owner is getting the benefit. If he hires an architect and the architect makes a mistake, why should he take it out on the hide of the long suffering contractor?

Perhaps more harm has been done contractors through the submission of details by the architect, that were not anticipated, than any other factor in present working conditions. Hundreds of instances might be cited where the details submitted by the architects were not shown on the original plans nor any hint given of the character of these details. It is all well enough to say that a contractor should not bid under these conditions, but when one considers that he probably would do little or no figuring unless under these conditions, it puts a different aspect on the case. Details should be submitted with the original plans.

Architects claim that they must hurry so with their plans that they have not the time to go into the details until the job is started. This argument, to my mind, is very poor. If they must get out the details sooner or later, they can arrange to do so sooner, as well as later. If the owners could be brought to realize what a difference it often makes in the expenditure for a building, they would insist that the details be prepared in full before bids are taken. As an architect remarked the other day, the reason contractors gave him such good tight figures for his work rested in the fact that his details were complete in every plan he issued. In order that justice may be done to all details should be as complete as possible in every set of drawings.

When Owner is Entitled to Possession

Contractors also believe that the owner should not be entitled to possession of the building until the entire contract price has been paid. The Uniform Contract does not so prescribe. The contractor should be allowed possession of the premises until full payment of the sum agreed upon is made. An owner may bring up all kinds of work and trouble after he has taken possession of the premises, even though the work is satisfactory and in accordance with plans and specifications in every respect. He then withholds the money and tells the contractor to sue him. Just because a window does not slide as it ought two or three weeks after a house has been occupied is no reason why the owner should hold up the last payment, but this is often done in cases where the owner takes possession of the property before final payment is made. The contractor has action, but no class of business men hate litigation worse than contractors.

There should also be provisions in the Uniform Contract, warranting that the owners of a building proposed, are the owners in fee simple of the property upon which the building is to be erected, or if the owners are not, it should be stated under what conditions the ground is controlled. In other words the contractor should be assured of the ability of the owner to pay for the building. Not long ago in Columbus we had a case of a man who took bids and let the contract for a $60,000 structure, and after the contractors had put $10,000 into labor and materials on the job, it was found that the owner not only did not own the land upon which he was building, but he did not have the money with which to proceed with the work. This is pretty serious business to a contractor, whether he be operating in a large or a small way.

The writer is inclined to the opinion that differences may be remedied by concerted action in bringing the matter to the attention of the American Institute of Architects which promulgates the Uniform Contract and the General Conditions of specifications.

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*Secretary Builders and Traders Exchange, Columbus, Ohio

A Truss for Frame Barn Construction

An Arrangement of Members Designed to Carry Roof Loads as Well as Side Pressure from Within the Barn

BY C. L. DEAN

THE writer has erected barns which stand up with trusses similar to the one for which the correspondent on page 470 of the October issue of *The Building Age* desires information. The sketches shown on the opposite page relate to a type of barn framing having all intermediate posts, beams and bracing formed into a truss clear of the central passageway. The expense of framing trusses of this nature should be no more than for any other type of barn frame.

The design is for a truss 30 ft. wide with 20 ft. posts and 18 ft. rafters, the latter to rest on the ridge and eave purlins. The ridge purlin is designed also to carry the hay track loads directly to the trusses, thus insuring a safe and easily connected track system for unloading hay into the barn.

Barn with Jack-knife Trusses

Some few years ago the writer assisted in building a very large hip roof dairy barn with double jack-knife shaped trusses of yellow pine, the work being done at East Lansing, Mich. Ten years later there was occasion to return to this place and the opportunity was improved to look over the barn. It stood true and plumb as the day it was finished and had given great satisfaction to the owners. In this instance the architect was present with his steel measuring tape to help us lay out and bolt up the first truss in the proper manner. There being eight or ten in all to make up, he left his steel measure for us to use in building the others. We had no use for it, however, as we utilized the truss first made as a measure and guide, building the others directly over it as it rested flat on blocks placed on the ground, thus saving time and insuring against any radical errors in measurements. The trusses were then slid along the foundations to their respective positions where they were raised, and nailed exactly in line.

The end of the barn was studded 20 ft. or so in hight and it was to this studding that we attached a block and tackle to assist in raising the first truss. This end framing was afterward well secured in place with latticed timber struts spanning out from the side of the truss and over to the end studding in such a manner as to hold it securely in place.

Foundation Construction

It is well perhaps to note that while the foundation loads are light—only about 5 tons on each truss shoe—the footing walls should not be slighted but be carried down to a good bearing below the frost line. There is only a slight tendency of a structure to spread on the foundations, but this tendency should be guarded against by setting good sized bolts in the tops of the walls and the sills well secured to them, as any little movement in this direction would tend to ruin the trusses.

Looking over the details presented herewith it will be noticed that a good many bolts will be required to build each truss. These bolts are what hold the truss together and give it the necessary strength to carry the loads which are imposed upon it. It therefore is not advisable to omit any of them without substituting an equivalent in their places as each one has been figured to carry a load of 1,000 lb. through the joint and in each joint there is barely enough to transmit the load which it should carry.

If 1 in. square or 1¼ in. round oak or yellow pine pins are obtainable it may be preferable to use them instead of so many bolts. In that case each pin should be nearly as strong as two bolts.

Suppose ten bolts are shown in a joint, then six or eight pins should be put in to take their places and just enough bolts used to hold the members from spreading.

In driving a pin it is well to place the grain in such a manner that the shrinkage will be with the main members. In addition to the bolts and pins all members should be well spiked.

The truss frames may be built of first-class soft pine lumber, although yellow pine or Washington fir are preferable if readily obtainable.

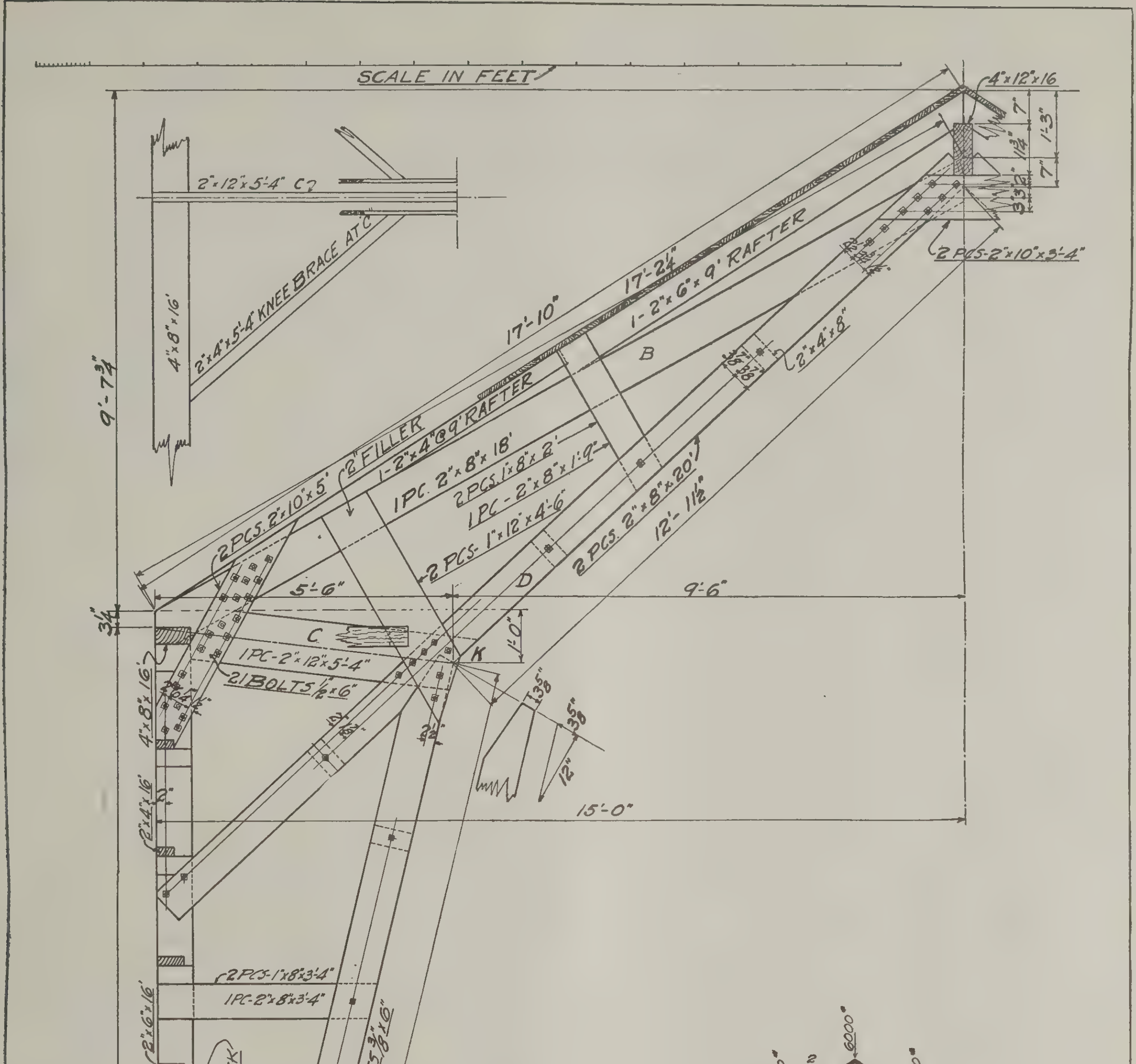
Vertical vs. Horizontal Siding

Men who observe closely have stated that barns covered with vertical standing siding, that is, natural standing position of the timber, will endure longer and hold the paint better than where horizontal siding is used. How true this may be matters not so far as the trusses are concerned, as they are equally good for either form of construction.

The matter of nailing the siding and roof sheathing bears an important part in bracing this kind of a structure. A building of this type covered with corrugated iron without any wood sheathing or other bracing would not be safe to construct. The sheathing braces and arches under many different conditions. Take for example the center ridge beam carrying the hay tracks and upper ends of the rafters. Here the roof sheathing tends to relieve the beam of the loads acting upon it by arching directly into the trusses. If we should remove the beam after the structure was completed the building would undoubtedly stand for a time with nothing but the roof sheathing to hold by reason of the arching action of the sheathing, but it would not be safe to try the experiment.

The point is this: the trusses should be well nailed to both the siding and the roof sheathing. Some builders would be inclined to set a rafter, say a foot either side of the truss, omitting the rafter fitted directly over the trusses as shown in the sketches. This would be a mistake as we would thereby lose much of the strength to be derived from the sheathing, as explained above.

The weight of each truss should be about 1200



Various details of a Truss for Frame Barn Construction as Suggested by C. L. Dean lb. built of pine lumber of the sizes given. This is considered sufficiently strong to withstand ordinary snow and winds. If, however, they are of great intensity it would be best to increase the timbers 3 x 8 in. instead of 2 x 8 in. The joint connections should be increased in the same proportion.

Should it be desirable to build this type of truss in other sizes or shapes, the builder would do well to investigate a little the stress of the various members. The writer has assumed a vertical load of 25 lb. per horizontal sq. ft., which seems ample for lumber, snow storms and wind included. This gives 3000 lb. at each eave and 6000 lb. at the ridge.

Referring to Fig. 1 of the accompanying sketches the direct tensional stress on the member *A* is equal to 3,000 times 9½ less 3,000 times 5½. Dividing the result by 5½ gives 2,182 lb. uplift on the member *A*. The dimensions, 5½ and 9½, are taken from the point *K* of the detail drawing.

The compression in member *E* is approximately 3,000 plus 3,000 plus 2,182 lb. Reference to tables of wooden columns in builders' hand books shows that *E* is safe to carry 400 lb. per sq. in. of section; that is, 400 times 32, which is 12,800. This is more than we have figured would be imposed upon it.

To complete the analysis a stress diagram, Fig. 2, may be drawn in the following manner: Assume a scale, say of ½ in. to the thousand pounds, the vertical line 1-a (2182 lb.) should measure 1 1/16 in. in length; the vertical line 1-2 (3000 lb.) should measure 1½ in. in length.

Next draw the lines *B* and *C* parallel to the truss members to intersection. Then draw *E* and *D* to intersection. Mark Fig. 2 with the proper letters and measure the lines with a rule. Each inch of length in Fig. 2 counts a ton of load for the truss member. This, I think, is sufficient information for the design of a truss of this size.

No side pressure of hay has been considered in these computations, as these pressures are slight and mostly at the bottom where a good foundation will easily take care of them.

Novel Feature of Building Illumination

The new building which is rapidly nearing completion at the southeast corner of Irving Place and Fifteenth street for the Consolidated Gas Company will have its facades illuminated at night by concealed lights in such a way as to give a most brilliant effect. Another new feature, and an interior detail that we understand has never been tried before, will be the lighting of the large hall, which is reached from the main entrance in Fifteenth street. Here there is a series of Pavanazda marble arches, in each of which are several panels of the same marble a quarter of an inch thick. Behind these panels there will be concealed lights which will shine through the marble panel work, producing a most remarkable lighting effect.

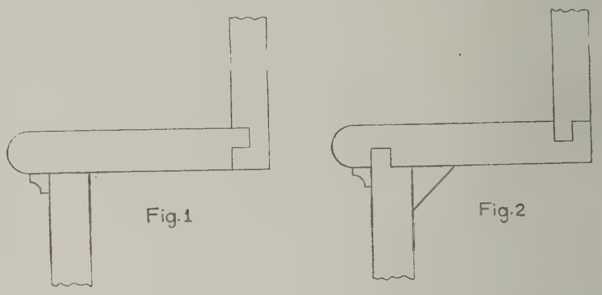
The new building is fireproof, and in this connection what is said to be an absolutely new system has been worked out and approved for the carrying of wires, telephone, high tension, electric light, gas and other pipes through combination boxes built in the floors. It is expected the building will be completed about February, 1914.

Experience of a Millman with Stairwork

In telling about his experience in getting out the material for the stairway of an apartment house in an eastern seashore resort, a millman writes to a recent issue of the *Wood-Worker* as follows:

"The opening of the summer season being near at hand and the firm being rushed with orders, the stock for the steps was taken out of the kiln before it had become thoroughly dried.

"If it is not otherwise specified, we always tongue the step and plow the riser like Fig. 1, but the contractor on this job wanted it done like Fig. 2. Steps and risers were to be glued and blocked together, the millman housing out the wall string. The treads on the horseline were intended to be 10 in., which, with 1¼-in. projection for nosing and ⅞ in. for the riser, would have made the exact width of step 12⅛ in. To allow for shrinkage I added another 1/16 in., and worked them 12 3/16 in.



Experience of a Millman with Stairwork

"Before that stairway left the mill those steps had shrunk fully 3/16 in., which, of course, kept the second riser over ⅛ in. away from the rise on the horse. With an elevation of sixteen treads, if they had been cut out exact, this would have amounted to over 2 in. on the last or top rise. But they were not; some treads were ⅛ in. less in width than others.

"The carpenter putting up the stairs (the same one who cut the horses) did not say a word about the steps being too narrow. He fitted and nailed them up the best he could. In this case the carpenter's mistake really helped out the stairman, but it made a very poor job."

The College of Forestry at Syracuse, N. Y., has just received from the Hammond Lumber Company of California, a heavy plank measuring 7 x 11 ft. in size and made from one of the giant redwood trees of that state. This is thought to be the largest solid plank of any kind of wood in New York state outside of the Museum of Natural History in New York City. In addition the College has recently secured what is thought to be the largest trunk of an ironwood so far found in New York state. The trunk has a diameter at the base of 25 in. and came from a tree growing on the city forest at Syracuse.

The College is securing valuable specimens of timber from all parts of the state for its museum and in addition to the specimens above mentioned it is securing trunks of trees from the Adirondacks and Catskills which will represent all of the native forest species of New York.

How Buildings May Be Made Ratproof

What Constitutes a Ratproof Building—Basements Require Special Attention—Remodeling Non-Ratproof Buildings

THOSE contemplating the erection of a new building or the repairing of an old one, whether it be of frame, brick, concrete, rock or other construction, should be informed as to the sanitary and economic benefits to be derived from ratproofing measures of a permanent character and should require the scrupulous application of such measures as a part of a builder's contract, says French Simpson in a Bulletin recently issued on the subject of ratproof buildings by the United States Public Health Service. The expense to be incurred is slight when compared with the cost of the building, and the measures applied will insure not only practical freedom from rats but in most cases freedom from various insects as well.

A Ratproof Building Defined

For practical purposes a ratproof building may be defined as a building constructed of material impervious to rats, in which all unnecessary or accidental openings have been permanently closed, and all natural openings provided with doors, windows, gratings or screens closely approximating such openings, and securely closed when the building is not in use.

The rat can be built out and destroyed by the application of the following measures:

The erection of ratproof buildings only.

The closure of all natural or accidental openings in existing buildings of ratproof construction.

The remodeling of all non-ratproof buildings, using materials impervious to rats.

The removal of material covering yards, sidewalks, and passageways which permit rat refuge.

The protection or removal of rat food.

The destruction of rats by poison and traps.

The new building, if of frame construction, should be placed upon a foundation wall of material impervious to rats, such as brick or concrete. This wall should be not less than 6 in. in thickness; should be laid without break around the entire building; should extend not less than 18 in. beneath the surface of the surrounding soil and upward flush with the under surface of the floor above. Floor joists should be embedded in this wall, or the spaces between the joists filled in and perfectly closed, up to the floor level.

Ground Areas

The ground area enclosed by foundation walls requires especial attention. If no food products are to be stored, prepared, or sold on the premises, the ground area should be covered with a layer of concrete not less than 3 in. thick, above which a floor of tongue-and-groove lumber should be placed, disregarding the dead space remaining between.

If the building is to be used as a fish market, bakery shop, sausage factory, candy factory, restaurant, kitchen or for the preparation of other foodstuffs, the ground area should be filled in with clean earth or sand to within 3 in. of the top of the foundation wall, over which should then be placed a layer of concrete not less than 3 in. in thickness, finished with a layer of cement not less than ½ in. in thickness. This surface, representing the floor of the building, should, for sanitary reasons, remain uncovered.

If the building is to be used as a bakery shop, meat market, butter shop, restaurant, delicatessen shop, or other place where foodstuffs are stored or kept for sale, the ground area preferably should be treated in a manner similar to that required where foodstuffs are prepared, a wooden floor, if desired, being closely laid over the concrete surface, care being used to see that no dead space sufficient to admit rats remains between the two. In lieu of this, the ground area should be covered with a layer of concrete not less than 3 in. in thickness, and the floor above constructed of two layers of 1-in. tongue-and-groove lumber, driven tight, between which should be placed a layer of wire cloth not less than 20-gauge nor greater than ½-in. mesh. This wire cloth should extend upward 8 in. on the side walls, and be covered with the baseboard.

Basement Ceilings

Wherever practicable and not prohibited by fire ordinance, basement ceilings should remain open and unsealed, in order that rat refuge may be prevented between the basement ceiling and the floor above. If a finished ceiling is required, such ceilings should be made and kept rat-tight. Should the premises above such sealed basements be used for the storage, preparation or sale of foodstuffs, the floor above the basement ceiling should be constructed of two layers of 1-in. tongue-and-groove lumber driven tight, between which should be placed a layer of galvanized iron wire cloth not less than 20-gauge nor greater than ½-in. mesh. This wire cloth should extend upward on the side walls not less than 8 in., and be covered with the baseboard.

Where the expense will not permit the installation of ratproof foundation walls as described, ratproofing of frame structures (if not contrary to building laws) may be accomplished in a less satisfactory and less permanent way by elevation. In this case the building must be elevated on free underpinning, not less than 18 in. above the surface of the surrounding soil. It is important that the ground area beneath the elevated structure remain clean at all times, and clear of lumber, boxes and debris; otherwise a convenient and perfect harboring place for rats will be provided.

If the building is to be constructed of brick, stone or concrete, a foundation wall as outlined will of necessity be required to support the building.

The same careful attention must be given to natural or unnecessary openings which may be made in the wall. Should chimney flues be carried by the wall from the basement to the roof and remain unused the openings should be closed with wire mesh or stopped with a close-fitting cover.

Side walls above the basement containing openings require little attention unless the building is close to adjacent structures or such openings convey electric or other wires, in which event the openings should be screened or kept closed.

The Bulletin brings out the importance of having all windows, skylights, doors, etc., kept tightly shut, and covered with close mesh wire. Basement windows in particular, should be given attention. Plumbers, electricians and others often neglect to properly close openings made for wires and pipes, and these afford excellent chance for rats to enter. To do this requires a very careful inspection, but if the building is to be ratproof, it is absolutely necessary. Old broken and abandoned pipes previously used for water or sewage occasionally are found entering basement walls. They offer a convenient highway for rats between the basement and the street or sewer, and should be permanently stopped with cement.

Open conduits for the conveyance of electric cables may be frequently noted entering basement walls. Openings around and within such conduits should be closed with fine cement.

The lower ends of chimney flues entering the basement, if unused, should be screened. They frequently convey electric wires from the roof to the basement. Black and roof rates easily climb up and down these wires, and in this way reach the roof or basement.

The Remodeling of Non-ratproof Buildings

This classification includes all frame structures, with or without basements, and generally without foundation walls and floors impervious to rats. The majority of all buildings fall within this class, and since they permit the easy access of rats, supply food and afford refuge, they represent the principal obstacle to be overcome in the ratproofing of cities or towns.

All such buildings should be remodeled and constructed with brick or concrete area walls, but since the area wall to be provided in such cases is for ratproofing purposes alone, the foundation wall of the structure need not be disturbed, the area wall being erected just within or without and against the old foundation. Preferably, this wall should be erected just within the old foundation. It should be constructed of brick, stone or concrete, not less than 6 in. in thickness, should extend not less than 18 in. beneath the surface of the surrounding soil and upward, until flush with the under side of the floor above. Should the building rest upon a brick or concrete foundation, an additional wall will not be required, but care should be used to see that the foundation wall extends entirely around the building. Wherever lacking in this respect, or otherwise defective, it should be repaired. If floor joists rest on top of this wall, the wall should be continued upward between such joists until flush with the under surface of the floor above. All openings around pipes or wires should be sealed with cement.

The ground areas or basement floors of such structures and upper floors and roofs should be treated in the manner outlined for new buildings, particular care being used to see that the additional ratproofing requirements are employed when such buildings contain foodstuffs.

In ratproofing dwellings it should be known that the greatest number of rats can usually be caught under the front steps. This should be remembered when remodeling measures are applied.

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Site of New Equitable Building, Historic Ground

While workmen were excavating 40 ft. below the street level near the Broadway and Pine Street corner of the excavation for the new Equitable Building, which is in course of erection on the site of the old structure, an interesting relic of Colonial days in New York City was brought to light in the shape of a 4-in. cast iron cannon ball. A curious incident of the finding of this relic is that the records of the time seem to show with considerable clearness not only how the cannon ball came to be there, but also who were the probable owners.

It is known that there was a considerable quantity of war munitions in the neighborhood in the troublous times of 1775 and 1776, for in June, 1775, Colonel Marinus Willett captured arms and ammunition from the British at the corner of Broadway and Beaver Street, and these were loaded on carts, taken up Broadway and dumped in the then vacant lot at the northwest corner of Broadway and John Street. It is not known how long they remained there, but probably for only a short period, and then they became part of a collection placed under the care of Jacobus Stoutenburg in the City Hall.

A few months later, in September, 1775, complaints were made that arms and ammunition were being removed without permission from the City Hall, and Jacobus Stoutenburg was moved to defend his position as custodian by an affidavit stating that upon receipt of news of the battle of Concord and Lexington the arms had been removed by sundry persons. The Stoutenburg family owned a considerable portion of the present site of the new Equitable Building, and it seems probable that, being custodians of the city's war munitions, they may have become possessed of some stray cannon balls and that one of them found its way to the bottom of the family well, where it had been reposing ever since. Possibly it may have been used to weight the "well-sweep," as at that time and since cannon balls have often lent their weight in more peaceful ways than those for which they were originally intended.

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Mammoth Sassafras Trees

In the yard of George Tisdale in the northwest section of Simpson County, Ky., are three sassafras trees, one measuring 12 ft. 8 in. in circumference, one 12 ft. 3 in. and the other 11 ft. 8 in. It is stated that this gives to Simpson County the distinction of having the largest sassafras tree in the world.

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A recent decision of a magistrate in British Columbia was to the effect that an architect cannot claim a mechanic's lien in connection with the preparation of plans for building purposes.

Prevention of Dampness in Buildings

Dampness May Be Due to Any One of Six Causes—Various Suggestions for Overcoming the Difficulty

ONE of the most important points to observe in building operations is that of keeping dampness out of all parts of the structure, says George Metson, a member of the Royal Institute of British Architects. The dampness may be caused by (1) there being no damp-proof course, (2) the damp rising from the ground, (3) the damp earth against the walls, (4) rain soaking in through porous parapet walls and copings, (5) driving rains against walls, (6) burst pipes or leaks in roofs and other causes avoidable by a proper state of repair being maintained. Beyond this last cause, which should never obtain at all, to attempt after the building is occupied to remedy any of the other five omissions or faulty construction is a costly operation. For example, the cost of inserting a damp-proof course into a wall constructed without one is about as five or six to one, according to the material used, as compared with the cost of putting one in at the time the building is erected.

The provision of a damp course is in most towns a necessity, as the building laws require one. Some of the materials in most common use for this purpose are a double course of slate in cement, sheet lead, hard blue bricks, glazed stoneware slabs or tiles, asphalt, asphalted felt, etc., such damp courses laid costing from about 3d. (6 cents) per foot superficial for bituminous sheeting (in rolls) to 1s. (25 cents) per same unit for thick sheet lead.

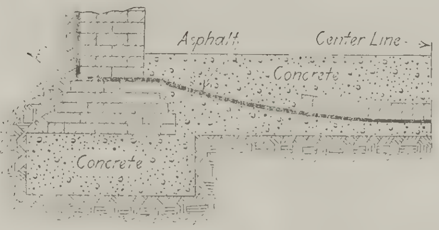

Fig. 7—Showing Arrangement of Damp Course to Resist Upward pressure of Water

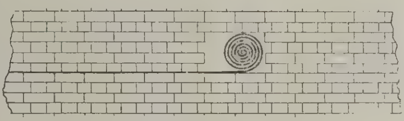

Fig. 1—Inserting Damp Course in an Old Wall

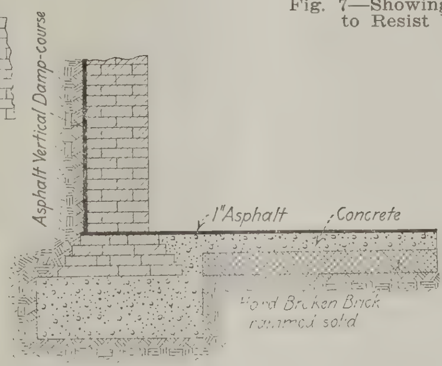

Fig. 6—Damp Course on Outside of Wall Below Grade and Extended Through Wall to Form Top Surface of Cellar Floor

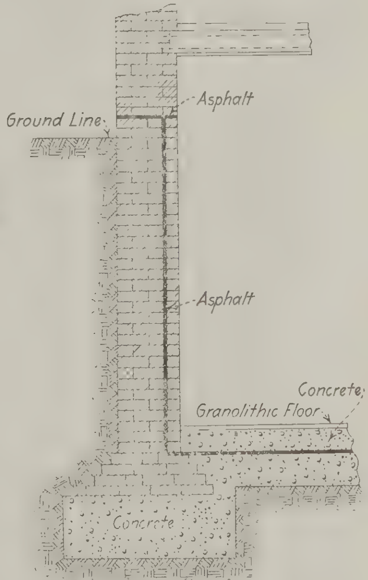

Fig. 5—Wall Rendered Damp Proof with Asphalt and Half-brick Built against it; or a space Left in the Brick Work and Hot Asphalt Poured in at Short Hights of the Work

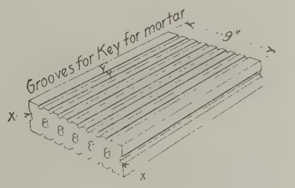

Fig. 2—A Glazed Stoneware Slab as a Damp-proof Course

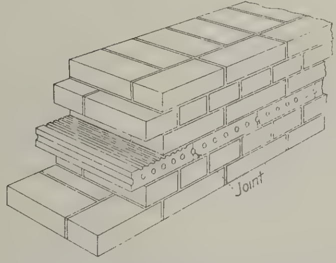

Fig. 3—Portion of a Wall Wherein the Slab Shown in Fig. 2 Is Used as a Damp Course

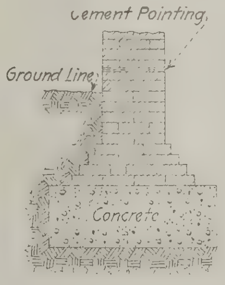

Fig. 4—A Damp Course of Slate

The Prevention of Dampness in Buildings—Showing Some of the Remedies Suggested

The chief point to observe is that the damp-proof course covers the whole of the wall, and in the case of slates that they are of a stout quality and correctly laid to break joints and are properly bedded above, below and between each with cement-mortar gauged one of Portland cement to one of clean sand. For appearance sake, and to prevent a lodgment for rain, moss, etc., the slates are generally kept back ½ in. on the outside of the wall and the damp-proof course pointed up in cement with a flush joint. Too much care cannot be taken to ensure that whole slates are used (and new ones at that), for unless this is so a straight joint occurs; then if the cement-mortar cracks when set at this point water can ascend in the wall by capillary attraction.

It would appear to be a simple matter to lay a damp course of slates in cement, but it is a matter wherein an error in method can be made, and, as usual, it is one of those small errors impossible of remedying when once covered up. The cement compo bed should be spread over the wall to be covered, preferably by the laborer, with the back of his shovel, or, failing that, by the bricklayer with his trowel, and at this point the bricklayer should commence the laying of the slates; but it is no uncommon practice for him to first of all cut the bed of compo across and raise it, as it were, into a series of small ruts or ridges, and on these to put the slates, tapping them home with the edge or the handle of his trowel. These ridges remain and set as such, and so the slates only have bearings at certain portions of their surface and invariably crack or snap at these points.

Sheet lead as a damp-proof course is the most expensive, as the lead should not be less than 5 lb. per foot super in weight. The bed on which it is laid must be smooth to prevent the roughness of the bricks or stones cutting through it, but at the same time its substance allows it to adapt itself to small irregularities of the surface on which it is laid. One disadvantage of this material as a damp-proof course is that under heavy loads it may squeeze out, and where this occurs the stones may spall off at the edges, for which reason the use of sheet lead between the beds of stones forming a column or pillar is now rarely used.

The cost of laying this damp course is certainly cheap, as it can be put to the exact width required, and the putting of it into position is a simple matter. Its great advantage, however, is as a damp course to be inserted into a wall built without one, where it can be rolled up and unrolled as required as in Fig. 1; but generally where such damp courses have to be inserted the cost of cutting out the brickwork is so high that in many instances the total cost is reduced by using a bituminous sheeting which can be similarly operated.

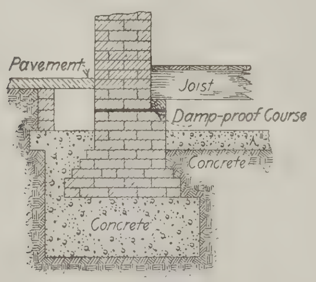

Fig. 8—Dry Area Where Floor and Pavement Are Practically Level

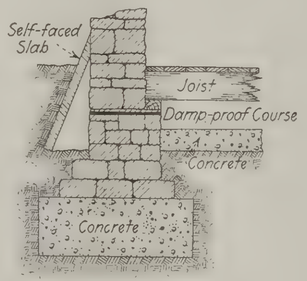

Fig. 9—A Cheap Form of Dry Area Common in Laminated Stone Countries

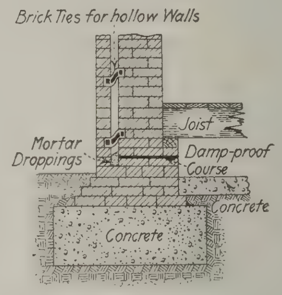

Fig. 10—Case Where Mortar Droppings Cause Dampness by Capillary Attraction

The Prevention of Dampness in Buildings

The use of a course of Staffordshire blue bricks set in Portland cement as a damp-proof course is by no means a good one, as even the best of these bricks are porous, and, this being so, dampness can rise through them. Even where the brickwork for some few courses below the damp course level are of blue Staffordshire bricks a proper damp-proof course should be inserted.

Glazed stoneware tiles or slabs, made to the width of the wall, form a good damp-proof course. They may be anything from 1 in. to 3 in. thick and are 9 in. long. Best stoneware of itself is practically non-absorbent, but when glazed is emphatically so. This material can also withstand heavy loads. Fig. 2 shows this type of damp-proof article, and Fig. 3 a part of a damp course formed of this material.

The perforations through the slabs are of great use, forming an excellent method of ventilating the underside, and particularly the corners and spaces under the wooden joists of ground floors so necessary if dry rot is to be avoided. Once more the bricklayer can spoil the efficiency of this damp-proof course in the jointing of the blocks or slabs. The groove or perforation at the joint is apt to become filled with mortar when moisture from the courses of brickwork beneath the glazed slab may rise up through this mortar in these vertical joints into the brickwork above and thus defeat the object of the glazed tile course at every 9 in. of its length. This defect is easily avoided by the foreman seeing that no mortar is put to this vertical joint, but that the hole or perforation is left quite clean and free from any jointing material. An attempt to overcome this difficulty on some jobs is often made by filling up the end grooves x and x in Fig. 2 with cement; but the cement as used is rarely of itself damp-resisting, so that this method cannot be said to get over the difficulty. Again, the cement joint may crack, when moisture can rise by capillary attraction, so it is much wiser to leave the perforations unfilled.

Asphalt as a damp-proof course is perhaps the best of all materials used for that purpose (excluding sheet lead on account of its greater cost). It is easily laid, is elastic to a certain extent, and yet able to withstand great pressure. There is also an entire absence of joints, and this is a particularly good advantage, as the joints in all other damp-proof courses are their weak points. At the same time care should be taken to see that the asphalt is from a reputable firm, as some are much too brittle, while others squeeze under a comparatively small load, nor yet can some withstand the heat as the better material can, and others are merely a mixture of coal-tar, pitch and sand.

Before any asphalt is laid the brickwork should be leveled, and it must also be dry and brushed clean, leaving the joints well flushed up with mortar. The course of brickwork to receive the asphalt damp-proof course should be laid with the frog downwards; in all other positions it is generally laid uppermost to insure it being filled up. The asphalt course should be of an even thickness, ½ in. or ¾ in., as may be specified, and to insure this correct thickness screeds must be fixed to the top edges of the length of the walls when the molten asphalt is poured on and surfaced with wooden floats.

In order to make quite sure of the perfectness of the jointing necessary say, from the leaving off of one day to the commencing on the following one, the last foot or 18 in. of the over-night work should be left but ¼ in. thick, allowing the next morning's work to complete the thickness insuring a waterproof joint.

Asphalted felts are serviceable as damp-proof courses, but care must be taken to see that the one used has a real claim for that purpose. Some simple tests to judge the quality and usefulness of some of the felts on the market are as follows: (a) To fold up the corners in such a manner as to form a tray, and if such tray will retain water for twenty-one days, leaving the underside of the felt perfectly dry, the sample may be considered good enough for its purpose; (b) pull the sample to pieces to see that each and every fiber is thoroughly coated with asphalt or bitumen. This last is important, as in the position in which it is to be used its edges would harbor insects, fungus, etc., if the felt was not saturated with bitumen to prevent it rotting. This liability to rot is one of the great disadvantages of felts as damp-proof courses, and as such some of the makes on the market hardly come within the meaning of the model by-laws of the Local Government Board, "or other durable material impervious to moisture," for which reason asphalted felts are not permissible in some towns as a damp-course material. Some of the best makes of asphalted felts are guaranteed by the makers as being both "durable" and "impervious to moisture."

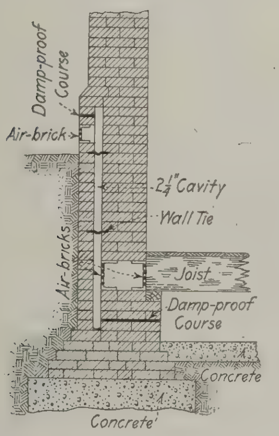

Fig. 11—An Example of Hollow Wall and Method of Treatment

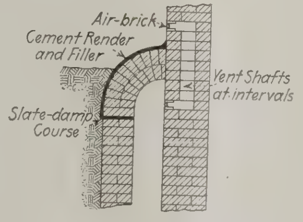

Fig. 12—Dry Area with Ventilation Shafts

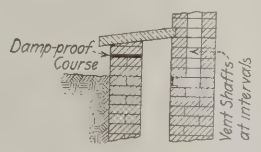

Fig. 13—Variation of Dry Area Shown in Previous Figure

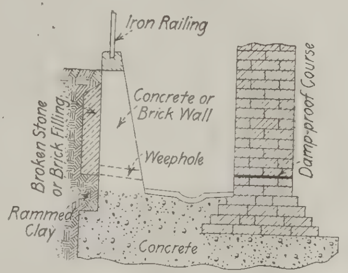

Fig. 14—An Open Area

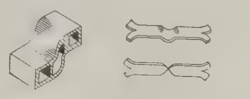

Fig. 15—Types of Ties for Hollow Walls

The Prevention of Dampness in Buildings

The second heading mentioned as a cause of dampness in buildings is that of dampness rising from the ground. To overcome this cause of dampness the model by-laws provide for a layer of good cement concrete rammed solid, at least 6 in. thick, to be put over the site to seal the ground air.

The number of voids in soils, as also their power of holding water, varies; but it may be said that all contain in smaller or larger quantities certain volumes of "ground air" at the surface and "ground water" below. As the latter rises or falls, according to the heaviness of the rainfall, so the "ground air" in the pores, so to speak, of the soil rise and fall, being on occasions expelled from the ground; also this ground air is drawn from the soil beneath a house on account of the greater warmth of the rooms over the site; also a rising temperature or a falling atmospheric pressure may extract or draw out such ground air.

Ground air is always impure, often resulting from the decomposition or decaying of vegetable or organic matter, or from soakages from defective drains, cesspools, etc., hence the great need of the asphalting or concreting over the site, as required by the model by-laws.

The concrete used for this purpose must be "good," but it is certain that a large proportion of the concrete put over sites is mere rubbish, often being merely placed on top of the ground, the turf not even being removed. The by-law does not ask for the concrete to be floated to a smooth surface on top. It is to be regretted that it does not, as it would the better ensure, at any rate, the top half of the 6 in. of concrete acting effectively, as some of the concrete put down by speculating builders is deplorable.

It is possible that in basements the floor may be below the standing level of water, when, in addition to preventing the water entering the side walls, it may be desirable to make the basement practically a water-tight tank; and in cases where great pressure of water is found it may even be necessary to reinforce the concrete over the site in order to prevent it being lifted by the upward pressure of the water. Several methods of making basements water-tight are shown in Figs. 5, 6 and 7.

In these same illustrations are shown methods of sealing the basement side walls against dampness coming in through them by reason of the damp earth next them, which was mentioned as the third cause of dampness in buildings. Some such provision is always necessary when the lowest story of any building is below the level of the surface of the ground. In the words of the model by-laws, "that where any part of a floor of the lowest story of such (new building) shall be intended to be below the level of the surface of the ground immediately adjoining the exterior of such story, and so that the ground shall be in contact with the exterior of such wall, he shall cause such story to be enclosed with double walls, having an intervening cavity between such walls of a width of 2½ in., and extending from the base of such walls to a hight of 6 in. above the surface of the ground immediately in adjoining the exterior of such story."

Several forms of cavity walls and dry areas are shown in Figs. 8 to 13.

Care must be taken to observe that mortar fallen into the cavity between the two thicknesses of brickwork does not defeat the object of the hollow ways by allowing moisture to be drawn across it and up the interior wall by capillary attraction, as shown in Fig. 10.

Dampness of Parapet Walls

Parapet walls are generally built of facing bricks —at any rate, on one side—and this class of brick is more frequently porous than that used for the general brickwork, so consequently it behooves the architect to find some means of preventing water penetrating downwards through the brickwork forming the parapet. One method is to build the *whole* of the parapet wall in cement-mortar, and, even better still, to insert one of the damp-proof courses already mentioned. Even when stone copings replace brick-on-edge and tile creasing the same need for keeping water out obtains, the stone being porous. Where it is possible it is much preferable for the slates to go over the gable ends of walls and form verges rather than have parapet walls to them.

Driving rains are a very common cause of dampness in buildings, particularly where the latter are in exposed positions. This condition may be met by building with hollow walls or by tile hanging them. Where the need of prevention of dampness from this cause has been overlooked resort has to be made to covering the walls with slates or tiles afterwards.

Other endeavors that have been tried are applying hot boiled oil to the brick walls with a large paint or similar brush. Dry weather should be chosen for this coating or coatings, and preferably a sunny day, when the walls will have been warmed by the sun.

Hot tar and melted pitch have been employed for the same purpose, in the same manner, and often to improve the appearance of the wall crushed shells or clean sand is thrown on to the tarred surface before it has set hard.

Treatment of Brickwork

Another method that has been tried is to give the brickwork a coat of soft soap, followed by a coat of alum. There are also fluids specially made for the purpose of filling the pores or voids in the bricks and so stopping their porosity.

Lack of proper maintenance forms the sixth cause of dampness in buildings and is unhappily the most common of all. The ways in which slates or tiles get cracked or broken are countless. Workmen repairing or renewing glass in skylights, cleaning out gutters, telephone linesmen, are all responsible for such breakages.

It is not, however, only by cracked or broken slates that rain water is let into the most vulnerable part of a building—the roof; it is sometimes caused by an absence of proper lap in the slating in the first place. The insufficiency of lap may not be all over the surface of the roof, and even if it is it may not be necessary to strip the lot, but rather, as a trial, it would be best to strip a patch about 4 ft. super. around where the water is penetrating and to give an extra lap to the tiles or slates if able to do so, or pieces of zinc can be inserted between the slates, pushed up as far as the nails will allow, but not showing below the edge of the slate.

Slaters may vary the lap, and they frequently do do so. Starting with the specified lap at the bottom, they gain the confidence of the clerk of works at the outset, and he is perhaps thereby induced not to pay the strictest attention to the slating work, and is consequently "diddled" by loss of lap higher up the roof. However, the fault is not as bad as it could be, as if there is to be any change in the lap it is more necessary to have a larger one at the bottom than at the top of the roof, as the greatest volume of water collects at the former end.

Another cause of water finding its way through a slated roof is that the undereaves course is often too narrow, leaving a space instead of giving a lap, and as this is the lowest end of the roof, where the water collects in larger quantities, and where, consequently, the best lap is needed, rain soon finds its way through, but instead of plastered ceilings indicating the leakage the water soaks into the brickwork, and appears soon after in stains on the paper of the walls of the room.

Cause of Leaky Roofs

Often roofs become leaky by reason of the timbers of the roof settling, or by insufficiency of strength to support the roof covering and workmen at times of repair or the additional weight of snow. at other times. In such cases the roof should be strengthened by strutting or firring it up.

The use of narrow strips of slate held, often, in position by one nail (two being impossible in the width) instead of using slate and a half or double slates is a cause of leaks in roofs, the small strips frequently getting displaced.

The careless or wilful holing of leadwork in hips and valleys may lead to drops of water entering the roof, as also the use of slates holed incorrectly and reversed end for end.

On zinc or lead flats rain often drives or is drawn by capillary attraction over badly constructed rolls. The cloak of the lead covering of a roll should always be on the opposite side to that of the prevailing winds or rains. If flats are liable to be much walked on battens should be placed on them after the manner of snow gratings, and the same precaution should be adopted in slated roofs by providing cat or duck-ladders for access to the various parts of the roofs.

Other Causes of Dampness

Other causes of dampness are leaky or choked-up gutters. Both defects are heralded by falling or running water, and there is no excuse for gutters remaining in their bad condition long enough to cause real dampness to the walls. In searching lead gutters for defects, it is necessary to wipe the inside surface dry to find the crack, which will generally be noticed by water oozing from it.

Other items in a building requiring periodical inspection to avoid dampness entering are skylights, the timbers and putty of which rot with time unless properly coated with paint at regular intervals; and, lastly, it is necessary to keep all drains in good and clean working order.

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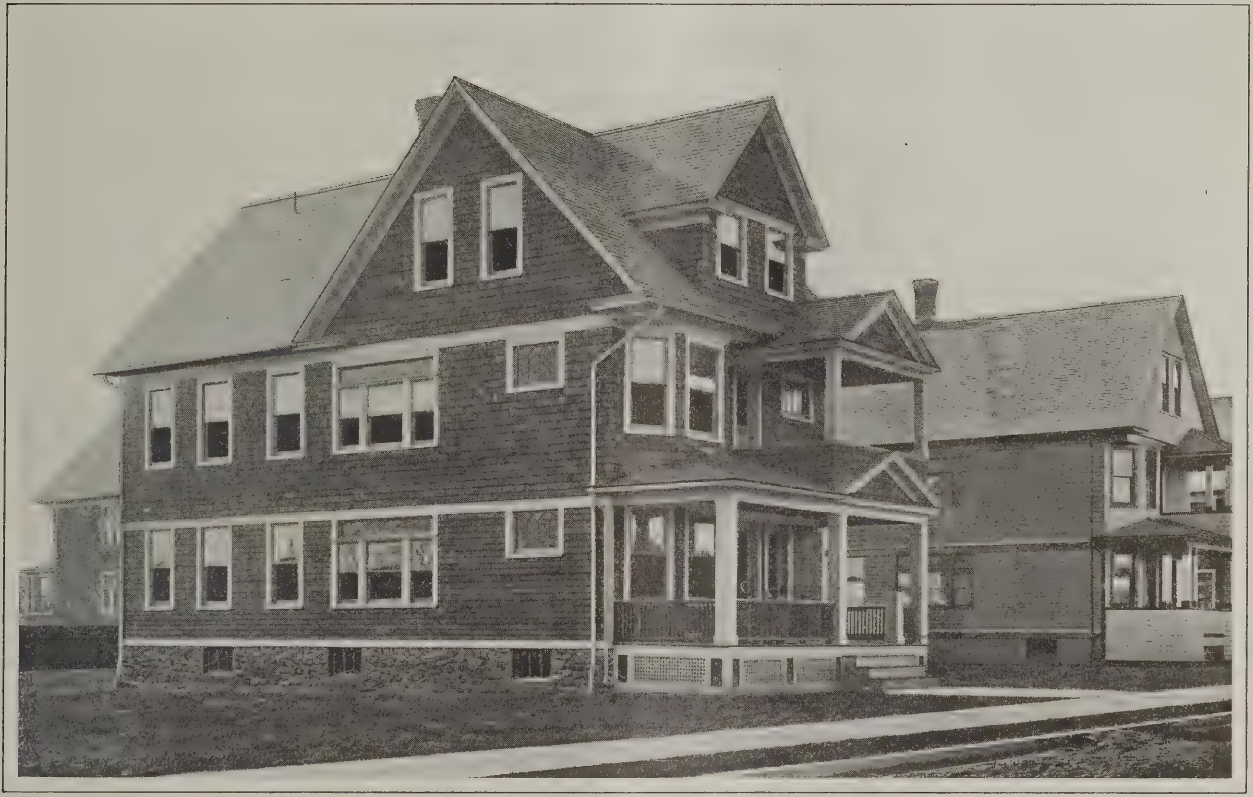
Blue gum is probably the fastest growing tree known, it often attaining a hight of 150 feet and a diameter of from 3 ft. to 5 ft. in 30 years.

House Built by Trade-School Students

A Two-Family Dwelling Recently Built by Carpentry Apprentices of State Trade School at Bridgeport, Conn.

By James F. Johnson, Director

SOME months ago the readers of *The Building Age* were doubtless surprised to read that the carpentry apprentices of the State Trade School of Bridgeport, Conn., had undertaken to build a house and later had successfully accomplished their purpose. At first, this rather amazed the ever doubting Thomases and their attitude showed plainly that they thought such was a hapless venture of exploitation. Probably they will again be surprised to know that we have successfully completed the erection of our second house, a photographic view of which is here presented.



Photographic View of Two-Family House Recently Built by Carpentry Apprentices

Already there are too many poorly equipped handy men who assume the name of carpenter. Their standards of workmanship and labor are low and it is most decidedly against the good of the trade to have young men become apprenticed to such conditions. Through imitation and what poor instruction they get, these young men are sure to follow in the direction of their fellow workmen. Such a class is a serious hindrance to the betterment of trade conditions and its influence is bound to be of no real good.

What the carpentry trade needs is good, sound, intelligent workmen who know their business, and through such men only can the conditions and standards of the trade ever hope to be maintained. There is a crying need all over the country for help. No one can afford to apprentice young men and instruct them as in days gone by. Competition has become so keen and the conditions of the trades have become so highly specialized that all efforts are bent on the increase of production.

The State Trade Education Shop of Bridgeport, Conn., was organized for the purpose of instructing in trades as represented by local conditions, boys who because of circumstances or some vague reason give up their school work at about the age of 14; and to aid through continuation classes those who are already in the trade, but still need training along the line they are following.

As in outside trade work, the work of the school centers around production. From this is obtained the drawing, mathematics and mechanics, all of which is based directly upon the jobs in process. Believing that the most reasonable way to teach a boy the carpentry trade is to have him instructed in what will be required of him when he leaves our shop, we have planned in connection with the regular shop work to build each year to customers' specifications, a house. All work connected with such is to be strictly according to trade practices and to be in charge of a competent tradesman, capable of instructing the boys.

Since this method of instruction has been started it might be interesting to know that there have been plenty of requests to build houses.

The Trade School House No. 2, as the carpenters call it, is an eight-room two-family house of the "Boston Flat" Style, and as the photograph shows, is quite modern. The first floor plan also shown here gives a fair idea as to the general arrangement of the rooms.

Some Details of Construction

The foundation is of stone 18 in. thick, supporting 6 in. x 8 in. long leaf pine girders. Sills 4 in. x 6 in. of the same pine were used, the end plates, 4 in. x 4 in. being of built up spruce. The corner posts are made of 4-in. x 6-in. pine and all joists on the first and second floor are of 2-in. x 8-in. spruce, the studs measuring 2 in. x 4 in.

Sheathing of matched 6-in. North Carolina pine was used and shingle strips 1 in. x 2 in. were put 5 in. on center. The shingles on the sides are of 16-in. red cedar and are placed 5½ to the weather, while the shingles on the roof are placed 5 in. to the weather. Red cedar siding placed 4⅜ in. to the weather is used on the first story.

The inside trim is of cypress finished in its natural color, the doors being of white birch.

The building is heated by hot air and both gas and electricity are used for lighting purposes. All plumbing is of the open work type finished in white enamel and with nickel plated fittings.

The work was begun last June by a foreman and eight boys and within a comparatively short time the framing was up and the building began to grow. As the work progressed each apprentice was instructed in the job before him and in all cases had a full understanding of what was to be done.

Class Instruction Held on the Job

Each afternoon at one hour before quitting time, the boys studied their mathematics. The class was held right on the job. Instead of school desks the boys sat on saw horses and used the big carpenter bench; instead of an arithmetic book the house plans were used and access was made to the problems of the day's work. This most ideal condition was thoroughly practical and furnished the best of material for instruction. Each boy kept his note book and the mathematics relating to the work on the building was worked out step by step.

Saturday morning the carpenters put in at the drafting board working on the drawings of the house, laying out their work for the coming week, or going over what they had just done.

The house is distinctively the product of the Carpentry Department of our school. The plans for the house were drawn by the boys, who in turn used them in building the house, doing all interior wood work, stair work and porch work.

Value of Training

The value of such complete training in this line of work can well be appreciated by the tradesman. The house forms a nucleus about which centers the drawing work, blue print reading and practical mathematics so necessary for a tradesman to know. The working from blue prints in such a case puts the boy right up against real building conditions and the great amount of good the whole work means to the apprentice might better be appreciated by a look into their happy faces as they are at work.

By instructing these future tradesmen through such a medium the Bridgeport school has accomplished what it started out to do. And it hopes each year to have the carpentry class build a house. In putting on the market a trained carpenter, it has proven that the trade school can do something materially toward the betterment of trade conditions and the satisfaction of a great need.

Besides the house building proposition there is the regular shop work which provides a fine line for instruction in that end of the trade.

The Work is Commercial

This work also is entirely commercial and these conditions are identical with what the young apprentice has to meet after leaving the shop for the outside trade. During the past year there have been built to the customers' specifications and order, door frames, window frames, screen doors, window screens, porch columns, storm houses, poultry houses, counters, tables, remodeling rooms, putting in partitions and such—all of which furnished real work of a general practical value.

In all cases the conditions under which the carpenters are working are identical with what exist in the trade and the transition from the shop to the outside trade is hardly noticeable for the graduate tradesman seems to fit into the work as though it were merely a continuance of his school work.

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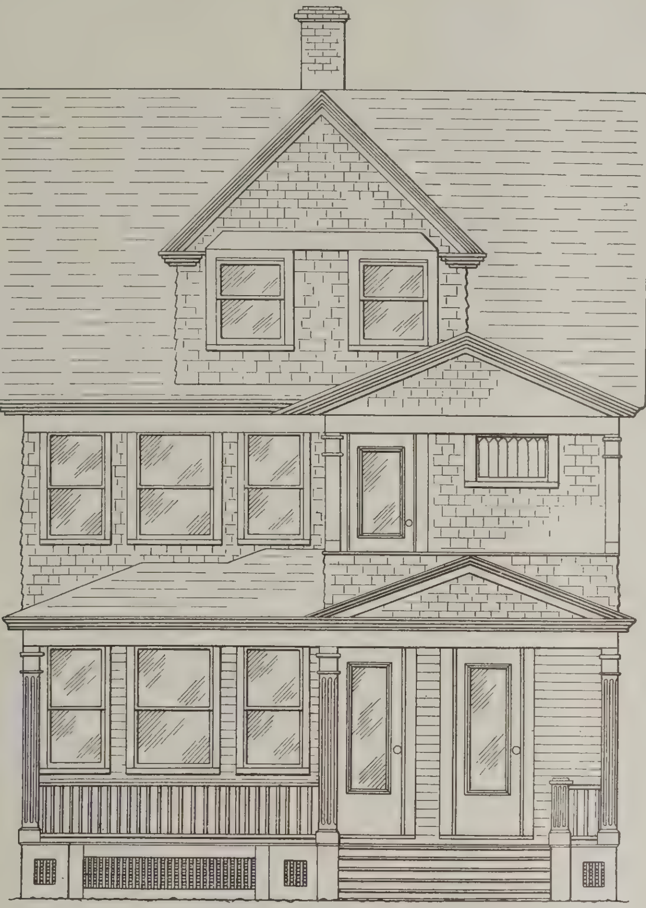
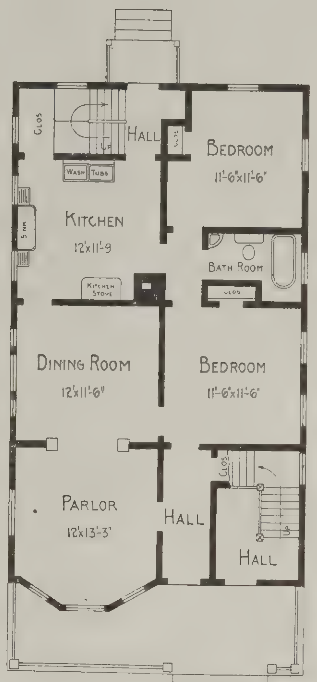
The Forest Products Exposition

While the Forest Products Exposition, to be held in the Coliseum, Chicago, April 30-May 9 next, and Grand Central Palace, New York City, May 21-29, is under the auspices of the National Lumber Manufacturers' Association, the policy of inviting and urging every branch and physical phase of the wood industry of America, directly or indirectly connected, to participate and have representation, is bringing about the contemplated and eminently desirable condition. Producers, manufacturers, machinery interests, the forestry service, federal and state, forest engineers and estimators, developers of new uses of wood as a basic material, are manifesting a keen interest in the important undertaking and indicating a material support and cooperation. In many directions concerns that will join associations and trade organizations in a general display will have individual and actively demonstrating exhibits of their own, and advices have been received at the Forest Products Exposition headquarters in Chicago from many who have no organization affiliations, assuring a general representation and display of the greatest importance to the entire industry.

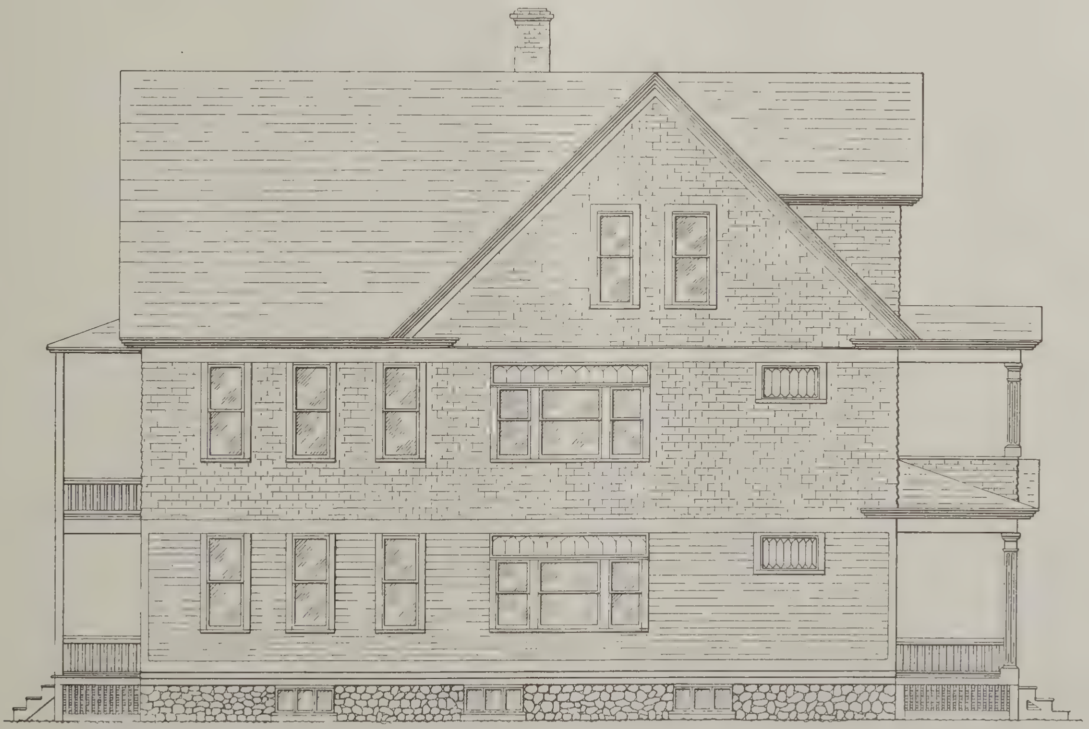
Manager George S. Wood recently visited New York City, addressing the Empire State Forest Products Association in annual convention, conferring with a number of probable exhibitors, and attending the American Forestry Association annual meeting and National Conservation Congress in Washington, D. C., in that city. Mr. Wood, in company with Secretary J. E. Rhodes, of the National Lumber Manufacturers' Association and Forest Products Exposition Company, discussed the



Front elevation—Scale 1/8 in. to the foot



First floor plan, the second being practically the same—Scale 1/16 in. to the foot



Left side elevation—Scale 1/8 in. to the foot

House Built by Trade School Students at Bridgeport, Conn.

exposition with many of the leading wood-industry men of the country and made valuable progress toward enlisting the support and co-operation of the Canadian forestry and wood-producing interests. Honorable Aubrey White, deputy commissioner of the Department of Forests, Lands and Mines of the Dominion, evinced a marked interest in the undertaking and expressed his heartiest approval, stating that he would give official encouragement to governmental and trade participation.

The American Forestry Association adopted a resolution endorsing Forest Products Exposition and encouraging active participation among its members wherever consistent. The National Conservation Congress endorsed the project of giving expositions as contemplated for the educational and demonstrating effectiveness of a visualization of the industrial and scientific work along the lines contemplated by the Forest Products Exposition.

The organization of the Pacific Coast Redwood Manufacturers and the Red Gum Manufacturers, with plans contemplating worthy representation in their respective commodities, brings the responsibility of the exposition management to the question of finding room enough in the two large buildings to go around among all those contemplating exhibits, and efforts are being made to have the New England, New York and Eastern branches of the industry properly represented.

The use of the Forest Products Exposition sticker-seals on the correspondence of business concerns and organizations in the trade has become general and the exposition management has ordered an additional quarter of a million to supply the demand. The posters are being generally displayed in every section of the United States and many Canadian communities and a recent request from abroad was received for posters and literature, showing the widespread interest and recognized importance of the Exposition.

Four-Room Apartments in New York City

An enumeration of the number of rooms in apartment houses in all the boroughs of Greater New York recently completed by the Tenement House Department shows that there is but one apartment in the entire city containing as many as 20 rooms; only 15 apartments having 15 rooms each and not more than 1075 apartments containing 10 rooms. In the Borough of Manhattan there are 159,541 apartments containing four rooms each, as against 99,487 apartments of this class in Brooklyn, 36,362 in the Bronx, 8117 in Queens and 776 in the Borough of Richmond, making a total for the entire city of 304,283 apartments made up of four rooms each.

The next most popular size appears to be the five-room apartment, of which there are 197,537 in the five boroughs divided as follows: Manhattan, 91,398; Brooklyn, 63,393; the Bronx, 35,885; and Queens, 6,329, with 532 in Richmond Borough. Next in order is the three-room apartments, of which there are in the entire city 190,517. Of this total Manhattan has 136,671; Brooklyn, 38,029; and the Bronx, 13,036. Of six-room apartments there are in the city 99,227; of two-room apartments, 70,588, and of seven-room apartments, 36,198.

These figures show that there are more four-room apartments in the Borough of Manhattan than of any other size and more of this size than of five and six-room apartments added together.

To Restrict the Hights of Buildings

In connection with the discussion which has been going on for some time past relative to the restriction of the hight to which buildings may in the future be erected the recommendations made in a report of the Hights of Buildings Commission presented on December 4 to the Board of Estimate's Committee on Buildings are of unusual interest. It is proposed in this respect to limit the hight at the street line to twice the width of the street, but this limit in no case would be less than 100 ft. or more than 300 ft. When the limit has been reached the buildings may be carried higher by setting the street walls back 1 ft. for each 4 ft. of increased hight. There is also a provision that no cornice may project into the street more than 5 ft. of the street width.

The Commission states that a tower may be erected to any hight provided it does not cover more than 25 per cent. of the lot and every part of the tower be kept at least 20 ft. from the lot and street line. According to the Commission 14 to 17 stories is about the "economic hight limit" on an interior plot on a 60-ft. street, and from 16 to 20 stories on a corner lot on a 100-ft. street.

The report emphasizes the fact that the "present almost unrestricted power to build to any hight over any proportion of the lot for any desired use and in any part of the city has resulted in injury to real estate and to business interests as well as to the health, safety and general welfare of the city."

The Commission believes that ultimately the city should be divided into districts with restrictions based on the needs of each district. Factories should be excluded from the neighborhood of Fifth avenue in order to preserve that thoroughfare as "a high class shopping center." Buildings on Fifth avenue should not be over 125 ft. high on the street line and 90 ft. on the cross streets which are 60 ft. wide.

House for the Tropics

A mosquito-proof and storm-proof house designed for the tropics was described at a recent medical convention in Liverpool, England. According to the story the house is almost entirely of steel, wood being used only where absolutely necessary, and being especially treated to withstand the attacks of insects. Foundations, floor and the lower part of the wall are all of concrete, while the upper portion of the wall consists of steel framing, filled in completely with mosquito screening. This screening is sandwiched between perforated metal sheets which prevent bulging.

The roof is covered with non-conducting slate and is ventilated by louvre windows at each end.

The interior is left as open as possible, so that whatever breeze there may be blows straight through the house from one side to the other. Shutters, operated by levers within, serve to close the house completely in case of storm.

Defamation of Architects and Builders

Their Dual Character Explained—When Criticism Is Actionable—What the Courts Have Held

By A. L. H. Street

THE law of libel and slander gives an architect or builder a dual character, for the purpose of redress for any defamation of his reputation—that of an ordinary individual citizen, and that of a member of his profession or trade. As an ordinary citizen his remedies are, of course, the same as those of other private citizens in general. It is with his vocational aspect that this article treats.

Actionable defamation in a vocational capacity is usually found to injuriously affect a business man by either imputing to him professional incompetency or dishonesty. When the words complained of, taken together, impute gross ignorance and unskillfulness in such matters as men of ordinary knowledge and skill in the particular trade or profession should and do know, they necessarily tend to bring him into professional disrepute, and, hence, are actionable. (62 Wisconsin Supreme Court Reports, 403.) Accordingly, it has been held to be actionable to say of an architect: "The poor fellow is crazy," and that his appointment as architect of a public building "could be regarded in no other light than a public calamity." (10 Illinois Appellate Court Reports, 570).

Distinction Between Libel and Slander

In this case the court said: "It was tantamount to a direct and positive assertion that the plaintiff was destitute of the necessary qualifications for the proper discharge of the duties of an architect." But it was decided in the same opinion that defendant, who made the statement to a newspaper reporter, knowing that it would probably be published in a Chicago newspaper, was not liable for any damage sustained by the architect through publication of the statement in a San Francisco newspaper, arising from loss of the position of architect of a public building in San Francisco, in the absence of a showing that defendant was responsible for the publication in the latter city. But, as decided by the Appellate Division of the New York Supreme Court, in order that words shall be libelous in themselves, as disparaging a person in his profession or business, they must have been spoken of him in relation thereto, and be of such character as would prejudice him by impeaching either his skill or knowledge, or his conduct in such business. (122 New York Supplement, 531.) Words written of a person's trade or business may be libelous when they might not be so if spoken of him personally, for every publication, written or printed, which as a necessary or natural consequence will occasion pecuniary loss to a business man is a libel. (138 Southwestern Reporter, 682.) This distinction between libel and slander is based upon the theory that written defamation is apt to be more deliberate, malicious and injurious than mere slander.

Any words, spoken or written of an architect or builder which tend to impair his credit, or to charge him with fraud, or indirect dealing, and that, consequently, tend to injure him in his profession or business are actionable without proof of special damage. In a Minnesota case, it appeared that defendant employed plaintiff, an architect to superintend the construction of a building intended to be fireproof. Shortly after the plaintiff's service in that capacity ceased, the defendant attached together several pine chips and pieces of wooden barrel staves, to which he attached the following writing signed by himself: "Notice. The annexed specimens were all found as placed under one window-sill of my building * * * of which" a named person "was brick contractor and plaintiff architect and superintendent. This brick contractor and the architect and superintendent are now doing business in this city, and would doubtless be pleased to labor for and serve you as faithfully and honestly as they did me." Defendant suspended the pieces of wood and this "notice" in a window in his office adjacent to one of the streets of Minneapolis, where it could be seen and read by persons upon the street. It remained so exposed for a long time. The Minnesota Supreme Court sustained plaintiff's right to recover damages on the theory that the writing would be understood to charge plaintiff with dishonesty, unfaithfulness and incompetency in his business habits and the practice of his profession.

When Statement Is Not Libelous

In a Missouri case, it was decided, however, that it was not libelous to publish of an architect who supervised the construction of a building that he promised to and did give work to defendants on the building for a specified commission paid to him by them, in the absence of a showing that the statement was intended to be defamatory and would be so understood by persons reading it. (80 Missouri Supreme Court Reports, 558.) The court said: "If this is a libel of plaintiff in his business, it is so on account of some intrinsic fact; or some special obligation he was under to his employer. If so, his petition must allege it."

And this statement, published in a daily newspaper, was held by the Maine Supreme Judicial Court not to be libelous as to contractors for the construction of a public building: "The masonwork is of the poorest quality, and it should not be accepted by the city. Too much sand has been used in the mortar, and to such an extent that it does not prevent the alkali, which is the life of the mortar, from running out, as can be seen from the white appearance of the building. Very many of the bricks are loose, the mortar being too lifeless to hold them together, and the contractors should be obliged to take down and replace the imperfect sections of the wall. The doings of the old Tweed ring in New York were no worse than much that has been done in connection with our city building." (34 Atlantic Reporter, 411.)

The grounds upon which this decision proceeds, as stated by the court, may be summarized as follows: The statement constituted no attack upon the character of the plaintiffs, either as individuals or in their business as contractors (?). The character of the construction of a public building was a matter of public importance and interest to the inhabitants and taxpayers and was therefore a matter of legitimate public discussion by the publishers of the newspaper, as well as all others who had, in common with the rest of the community, a public and a private pecuniary interest in the building. Every one is entitled to comment upon matters of public interest and concern, provided he does so fairly and with an honest purpose. Such comments or criticisms are not libelous unless they are written maliciously. There is a material difference between an attack upon a public work and upon an individual. The Maine court expressly decided, however, that when comment or criticism of a man's work becomes an attack upon his private or business character, then the element of malice comes in and stamps the statement as actionable libel. The decision in this case was partly influenced by an earlier holding of a federal court that the safety of a bridge for public travel involved such public interest that a newspaper might discuss its construction, though the criticism reflected, to some extent, upon the character of the builder. (10 Federal Reporter, 619.)

A Pennsylvania court has held that it is not actionable to charge building contractors with mere failure to comply with their contract, or mere deficiency in workmanship or amount of materials used, in the absence of proof of special damage resulting to the contractor from such statement, if it was false. "If, however," the court said, "they mean more than that; if they mean to charge either the actual crime of stealing, or, failing to go quite so far as to charge an actual crime indictable by the penal laws of Pennsylvania, the article charges such a fraudulent evasion of their contract as would tend naturally, if believed, to affect the plaintiffs injuriously in their business, * * * they are defamatory in the sense of the law and *prima facie* they sustain the plaintiffs' action, and the plaintiffs are entitled to recover." (11 Philadelphia Reports, 287.)

A builder was held in a New Jersey case not to have a right of action against an owner who stated that he stopped payment on a check issued to the builder because the latter had "misappropriated" money which had been previously paid him under their contract, regardless of whether the statement be regarded as a charge that plaintiff used the money dishonestly or that he did not pay for labor and materials. (57 Atlantic Reporter, 157.) The court said: "The first imputed meaning does not suggest anything relating to the plaintiff's trade or business, and therefore does not state a case within that class of actionable words; nor does it indicate a criminal offense, without which, in the absence of special damage, words not relating to one's trade, business, profession or office are not actionable. * * * The other imputed meaning strips the defendant's assertion of any defamatory sense, for, as already stated, the plaintiff had a perfect right not to use the money, which was paid him on the contract, for the purpose of paying the laborers and materialmen."

◆

Exhibits at Coming Convention of Building Trades' Association

In connection with the annual convention of the National Building Trades and Employers' Association to be held in Louisville, Ky., January 20 to 23 inclusive, and with headquarters at the Seelbach Hotel, there will be a display of building materials and construction appliances. The space devoted to this purpose is on the same floor as the convention hall and through which all delegates and visitors must pass to attend the sessions.

A committee has been appointed to install at actual cost all materials sent for display and in case an exhibitor has no local representative his display will be kept in order and literature distributed without charge by the management.

A large attendance is expected which will represent all the important interests associated with the building trades of the country.

◆

New York City's New Court House and Jail Building

In the competition in plans for the new East Side court house and jail to be located at Second Avenue and Second Street, New York City, the jury of architects selected to pass upon plans, chose those of Alfred Hopkins, 11 East 24th Street, New York. Ten architects were in the competition and the judges were William R. Mead, Austin W. Lord and Paul P. Cret.

Mr. Hopkins won the prize because he succeeded in designing an office building with a four-story jail on top of it. The new building is to be 100 ft. square, and the cost is placed at $350,000.

◆

Tile Partitions in Buildings

Hollow tile for partitions is made in two grades known as porous and semi-porous, the result of mixing in the clay a proportion of sawdust which burns out, 20 per cent. of sawdust being used in the semi-porous, and 25 to 35 per cent. in the porous. This leaves the finished product in such a condition that it can be cut with a saw and nails can be driven into it, says Henry G. Tyrrell in *Engineering Magazine*. The semi-porous is used for partitions with about 40 per cent. of full porous ones to hold the nails where trim is needed. Solid or dense tile is suitable for floors but not for partitions, excepting perhaps in outside exposed positions, and wood nailing strips must then be inserted if nailing is needed. The blocks are made either 12 inches square or in either form, 12 inches long and 4 to 8 inches deep, but the large square ones can be laid much faster than the smaller ones and at a less labor cost.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

Address Wanted

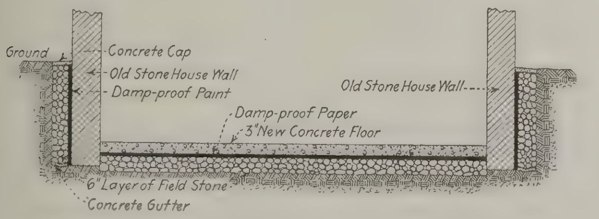
We have repeatedly called the attention of our readers to the fact that all communications intended for editorial consideration should be signed with full name and address, not necessarily for publication, but to permit of correspondence with the writer in case such a course should be found necessary. It very often happens that a correspondent in asking a question does not give sufficient information to permit of a comprehensive reply thereto and it becomes necessary for the Editor to secure additional data before publishing the request. This can only be done when the writer signs his letter with full name and address. We now have before us a communication from a Brooklyn correspondent who asks a question regarding an article which appeared in our columns some months ago, but who simply signs his letter with the initials "M. J. C." If he will furnish his full name and address we will take pleasure in giving him the information desired.

Rendering a Cellar Damp-Proof

From C. S. P., Wilmington, Del.—I own a house in the country which has a damp earth cellar floor and I propose putting in a cement floor in accordance with the enclosed sketch which represents a vertical cross section through the cellar.

I intend to dig the earth away from the outside walls and then paint them with damp-proof paint and refill with a 6-in. layer of field stone.

The cellar has eight small windows and is divided into three rooms with stone walls between each room. The tops of the cellar windows were on a line with the top of the ground, but I have had the lawn graded around the house so that the earth is now 3 in. below the bottoms of the cellar windows, which will make the cellar much lighter, it having been very dark and rat-ridden. The dampness I attribute more to sweating walls, darkness and poor ventilation, but as I wish to store furniture, books, etc., in this cellar I wish to make it as damp-proof as possible.

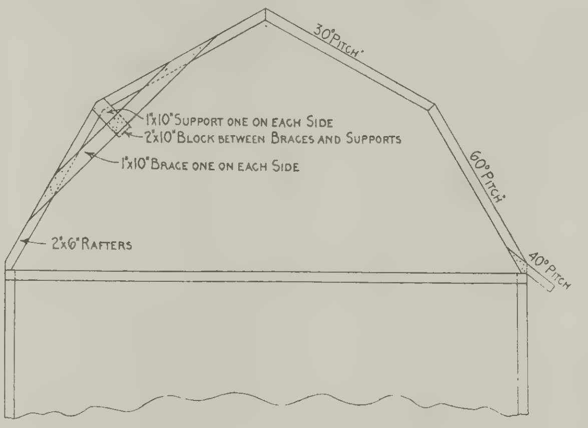


Rendering a Cellar Damp-Proof

The house is 30 x 50 ft. in plan, sits on a hill, and I am inclined to believe that the method outlined will make a perfectly dry cellar, but I would like very much indeed to have the benefit of practical readers of the paper, who may have been called upon to solve problems similar to the one which confronts me. Any information which may be given will be duly appreciated.

Self-Supporting Barn Roof

From J. E. H., Long Point, Ill.—I am sending herewith a sketch of one of the self-supporting purlin barn roofs that I recently built. The construction represents my own idea and it may be of interest to "O. S. W.," of Robinson, Kan., whose request appeared in the November issue of the paper.


30° Pitch
1"x10" Support one on each Side
2"x10" Block between Braces and Supports
1"x10" Brace one on each Side
60° Pitch
2"x6" Rafters
40° Pitch

Self Supporting Barn Roof as Contributed by "J. E. H." of Long Point, Ill.

An examination of the sketch will show that there is one long 1 x 10 in. brace on each side of the rafter, also a short support 1 x 10 in. in size on each side of the rafter but running at right angles to the long brace and concealing the joint of the rafters. There is a 2 x 10 in. block between the braces extending up to the rafters.

If any of the readers has a better method I would be glad to hear from him.

Finding Lengths and Cuts of Rafters with the Steel Square Without Drafting

From W. S. W., Pleasant Ridge, Ohio.—On page 476 of the October issue of the paper "W. M. O.," Kingsbridge, N. Y., says take the length and run on the steel square to get the side bevel for the valleys shown in his drawings. This is wrong and I think he will see it if he will give the matter a little closer attention. In his lower drawing he shows it correctly and if one desires to use the steel square he must get the lengths from that drawing. Take the distance 6-x on the tongue and the distance 6-4 on the blade and the blade will give the cut.

The other way would be all right for a square valley but not for this one.

The read will see that the distance 6-x is not as great as n-d on the upper diagram on page 476, while the distance 5-x is greater than c-m.

I do not mean to say that "W. M. O." does not know better, for I think he does, but it is evidently an oversight on his part and I merely wish to call his attention to it.

Meaning of "Radius of Gyration"

From W. M. L., Orange, N. J.—I would appreciate it if some of the readers of the paper would explain in detail through the Correspondence columns the meaning of "Least Radius of Gyration."

Answer.—The following comments are furnished by Ernest McCullough, C. E., in reply to the above:

A professor of engineering once said of the radius of gyration that it was an example of fine phrasing, for it was not a radius and had nothing to do with gyration. He was right, for to him it was merely a mathematical quantity used in certain computations. On the whole this is perhaps the best way to regard it and some text books on the strength of materials define it in words as "The square root of the Moment of Inertia divided by the Area," or, in mathematical form

$$r=\sqrt{\frac{I}{A}}$$

The whole subject of the moment of inertia, including, of course, the radius of gyration, is one of pure mathematics and a discussion is hardly necessary in any book dealing with structural work, the results being all the designer requires. For this reason many writers fight shy of an explanation of how it is derived.

A comparatively simple explanation, however, is possible. The radius of gyration does happen to be a radius and it does have something to do with gyration, but with these matters the mathematician and the physicist alone have any concern, the structural designer knowing the radius of gyration as a quantity fixing the location of the center of area of a plane surface on which eccentric compressive stresses act.

First, let us take up the method of moments for finding the center of gravity of an irregular shaped body. In Fig. 1 we have an I-beam 10 ins. deep and 5 ins. wide, with an area of 18 sq. ins. The center of gravity is to be found.

The figure is divided into equal squares, each with an area of one square inch. Two axes are drawn, one at the left end marked A—A′ and one at the lower edge marked B—B′. First take moments about axis A—A′.

The area of the stem = 10 ins. and the area of each flange = 4 ins., after deducting the area of the small square that is common at each end to the stem and the flange. The distance from the axis is taken to the center of the area of each section.

Moment of left end flange	$= 0.5 \times 4$	$= 2$
Moment of stem	$= 5.0 \times 10$	$= 50$
Moment of right end flange	$= 9.5 \times 4$	$= 38$
		90

$$\text{Total moments divided by area} = \frac{90}{18} = 5 \text{ ins.}$$

The center of gravity is therefore 5 ins. from axis A—A′.

Next take moments about axis B—B′.

The area of each flange is taken as 5 sq. ins. and the area of the stem between flanges as 8 sq. ins. This might have been done at first for the moments about axis A—A′, for the result would not have been different from that obtained.

Moment of one flange	$= 2.5 \times 5 = 12.5$
Moment of one flange	$= 2.5 \times 5 = 12.5$
Moment of stem	$= 2.5 \times 8 = 20.0$
	45.0

$$\text{Total moments divided by area} = \frac{45}{18} = 2.5 \text{ ins.}$$

The center of gravity is therefore 2.5 ins. from axis B—B′.

In obtaining the radius of gyration of a section the method is similar to that just illustrated for finding the center of gravity. The problem is a kinetic problem, that is it has to do with moving forces and the energy developed. If a body having a mass, m, and moving in a straight line with a velocity, v, is stopped the kinetic energy developed $= 1/2\ mv^2$.

The rim of a flywheel moves with a greater velocity than any point nearer the center and the relative velocity is governed by the distance of the point from the center, as compared with any other point between the center and the rim. Assume several bodies fastened to a rigid frame and revolving about an axis O, and we can increase the number of these bodies to such an extent that they will form a solid mass, or an area. Thus we obtain what the mathematician terms "infinitesimal" masses or areas.

A radian is the unit angle used in mathematical investigative work. It is the angle included between two radii subtending an arc equal in length to the radius of the circle. This makes an equilateral triangle with one curved side, so the angle between the two straight sides is less than one-third of 180°. If all the sides were straight each interior angle would be one-third of $180° = 60°$. The radian angle $= 57.3°$, but in the work we propose doing the size of this unit angle is not considered. The unit angle, the radian, is merely the measure of the space passed over by rotating bodies in a given time. On the spoke of a flywheel we can paint several marks. When the wheel rotates each mark passes through the same angle in a given time, so that all pass through the same number of radians in a certain time, but the velocity is greatest for the mark farthest from the center.

In Fig. 2 we have several bodies rotating about a common center, O, at a uniform rate of k radians per second. The velocity of each body, or mass, is equal to the distance from the axis multiplied by the number of radians the mass passes in one second.

Let k = radians
x = distance from axis to center of gravity of mass
v = velocity in any unit
then $v = kx$

and the kinetic energy of the mass $= 1/2\ mv^2$.

The kinetic energy of the figure will be as follows, considering the several bodies attached to the rigid frame as making the figure.

$$2\times(5k)^2+3\times(2.3k)^2+4(2k)^2+5(2.5k)^2+6(4k)^2\times1/2=1/2(2\times25+3\times5.29+4.4+5\times6.25+6\times16)\times k^2=\frac{209.12\times k^2}{2}$$

The total mass $= 2+3+4+5+6 = 22$, and the average distance to the center of gravity of the different bodies $= \sqrt{\frac{209.12}{22}} = 3.08$.

The total kinetic energy of the bodies $= 1/2 \times 22(3.08)^2\times k^2$. The letter k indicates the number of radians passed over in a given time, so by substituting the required number any desired velocity may be obtained.

The operation just completed tells us that if the whole mass of the figure is concentrated in a ring, instead of being composed of several bodies attached to the corners of a rigid frame, the distance from the center of gravity of this ring to the axis of rotation is 3.08 inches. The distance is the radius of gyration of the figure.

Let M = sum of all the infinitesimal areas, or masses.
m = each small area, or mass.
Σ stands for the expression "The sum of quantities in the parenthesis"
r = radius of gyration
I = moment of inertia

then $I = Mr^2 = \Sigma(my^2)$.

Each section has two moments of inertia and two radii of gyration. In Fig. 3 draw axis 1-1 and axis 2-2 through the center of gravity. Assume the figure to be divided into infinitesimally small areas, which will be called a, multiply each by y^2, the distance from the axis (neutral axis) drawn through the center of gravity of the section to the center of gravity of each small area. The sum of these gives the moment of inertia. This work is accomplished by aid of the calculus, but may be performed graphically, the more numerous the small areas the more correct the result. Usually the figure will be divided into an equal number of strips, half on each side of the neutral axis. The work indicated is performed on the strips on one side and the sum multiplied by 2 to give the total moment of inertia.

The moment of inertia divided by the distance from the neutral axis to the extreme fiber gives the section modulus. This is used in beam calculations. The section modulus multiplied by the unit fiber stress gives the moment of resistance. The moment of inertia divided by the area gives the square of the radius of gyration, used in column calculations, so it may be seen that the moment of inertia is a very important property which determines the strength of shapes, regardless of the actual strength of the material.

Professor Gordon made a number of tests of columns and from an analytical study of the bending under load developed a formula for the strength of columns in this form

$$W = \frac{C}{1+a\left(\frac{l}{d}\right)^2}$$

in which

C = total compressive strength of the material per sq. in.
W = total breaking load
l = length of column
d = least diameter. If a piece of material 6″ × 4″ is used as a column the 4″ dimension will be the diameter (or thickness) used
a = a constant depending on the material and determined by experiments on columns.

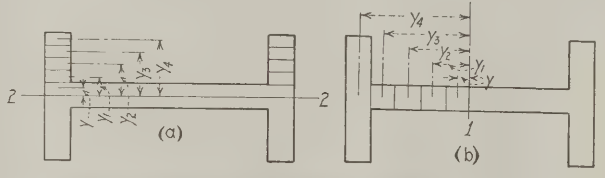


Fig. 3 –Diagrams Illustrating Moment of Inertia

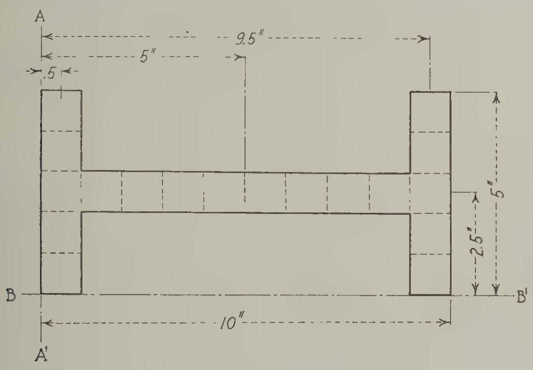


Fig. 1—Finding Center of Gravity of An Irregular Shaped Body

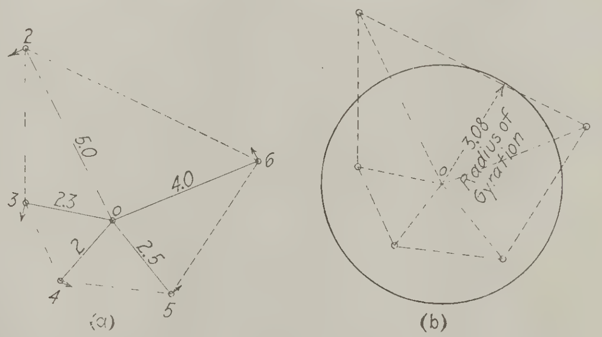


Fig. 2—Diagrams Illustrating Velocity of Various Bodies

Meaning of "Radius of Gyration"—Contributed by Ernest McCullough

Professor Rankine modified the formula so that instead of the least diameter the least radius of gyration is used. In its present form it is the Rankine formula; but at first it was called the Gordon-Rankine formula. In a number of textbooks and in some manufacturers' handbooks the Rankine formula is styled the Gordon formula, the compilers evidently not having a clear idea of the real difference. Professor Rankine used the least radius of gyration for the reason that it is dependent entirely upon the shape of the section and therefore gives truer results than by taking the least width, or thickness, of a section used as a strut or column. When C is the ultimate strength of the material per square inch a factor of safety is applied to the result. It is the custom to-day to use a safe fiber stress and obtain the average allowable safe stress per square inch instead of the total load. In other words, instead of W we get $p = \frac{W}{A}$, in which A = area of column section.

Let 12,000 lb. per square inch be the safe maximum fiber stress, and $\frac{1}{18,000}$ be the constant, then the Rankine formula for mild steel columns with square ends is

$$p = \frac{W}{A} = \frac{12,000}{1 + \frac{l^2}{18,000\, r^2}}$$

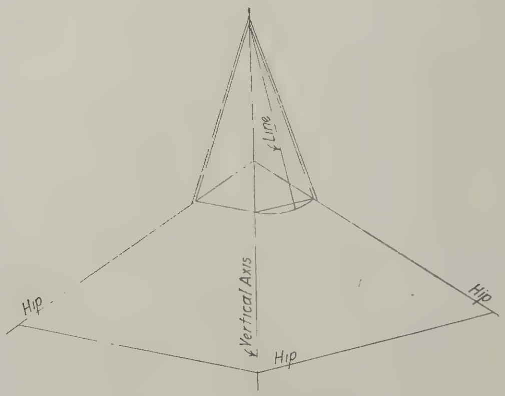
in which r = least radius of gyration.

The tables in the steel manufacturers' handbooks give the radius of gyration for each rolled section, with reference to axis 1-1 and also axis 2-2. The only time it becomes necessary to figure this factor is when a section is built up with a number of plates and rolled sections riveted together. The way it is done is to make a drawing of the section and obtain the area of each piece used in making it, also the center of gravity of each piece. The center of gravity is found for the entire section and the two axes drawn. From each axis find the distance to the center of gravity of each piece, square each distance, multiply by the area of the piece considered, add the results and get the moment of inertia. Divide by the total area and extract the square root. The best column section is one with equal moments of inertia about both axes. Since few built-up columns are so made the least radius of gyration is used in order that the columns shall be strong enough across the weakest section.

Framing a Conical Roof

From D. P. B., Redford, N. Y.—In my opinion "J. W.," Victoria, B. C., whose inquiry appeared in the October issue, has a very simple job on his hands. There is no need of weary calculations. The sketch which I send shows how to begin. The rise of the hip is one-third. The diameter of the cone is 8 ft. and the hight 12 ft.

Saying the "vertical axis of the cone must coincide with that of the hips" is simply pedantic for saying the cone must be plumb.



Framing a Conical Roof

Using 2 x 4 in. rafters cut the two pairs to set on opposite hips. Lay off the bottom cut 4 x 12; add to the toe one-third of the rise of the hip per foot. The correspondent will probably use 16 rafters which fill a 10-in. circle. Set a plumb cut 5 in. from the vertical axis and bevel the rafters.

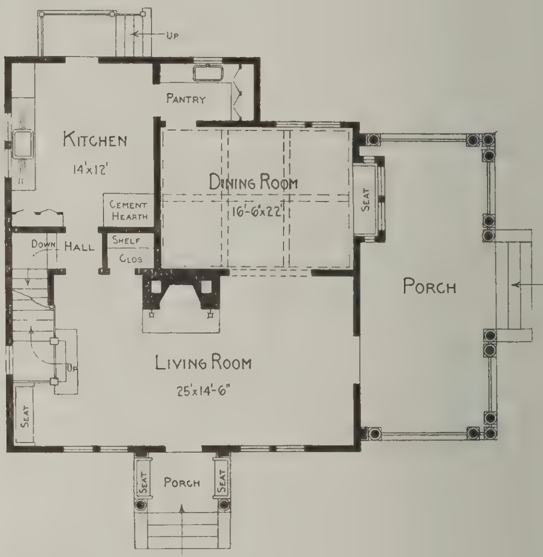
After setting up rafters on each hip make a quadrant of 3 ft. 8 in. radius and set it on the inside of any pair of rafters. The ends should end on the center of the rafters and set horizontally. Divide the quadrant into four parts which will give about 17 in. for the center of the rafters. Take a silk line and fasten to the apex of the cone, passing through one of the divisions on the quadrant to the roof. Draw tight, set the bevels and measure the length of the rafters.

If the correspondent is a good millwright he will know all about this. Repeat for the other quadrants. There is no place for plates.

For method of finishing see the article entitled "Roofing a Round Silo," which appeared on page 144 of *The Building Age* for March, 1913.

Front Elevation and Roof Plan Wanted

From J. J., New York City.—I am sending herewith the plan of the first floor of a house for which I would be glad to have some of the architectural friends of the paper furnish for publication a front elevation and also a roof plan. I notice that in various issues in the past correspondents have asked questions of this kind and the replies forthcoming have been both numerous and of a gratifying character.



Front Elevation and Roof Plan Wanted

What Readers Say of *The Building Age*

From James M. Smith, Wilmington, Del.—I am one of the few who have been taking *Carpentry and Building*, or *The Building Age* as it is now called, ever since it was first published. I have the first 25 volumes bound. It has been of great use to me, more so when I was an apprentice and journeyman. I now have been engaged in the general contracting and building business for over 20 years. I have the honor of being the builder of the largest and finest residence in Delaware, namely, "Nemours," the residence of Alfred I. DuPont, Esq., Carrere & Hastings of New York City being the architects for such. I am now building from their plans on the same estate the largest and finest private garage in the state. Have also built the extensive garden work and greenhouses and various other buildings which go to make up a fine country estate.

Am glad to see *The Building Age* broadening out and improving all the time. It has my best wishes for continued success.

From A. B. Crosby, Yarmouth, N. S.—I have been a reader of *The Building Age* since January, 1882, and have every number on file during that time.

For the past 30 years I have been a subscriber to a number of trade journals, but I think *The Building Age* is by far the best of any of them on matters relating to the building trades, and hope I may be spared to enjoy it for many years to come.

From C. F. K., Grand Rapids, Mich.—I want to add my testimony in appreciation of the value of *The Building Age*, to which I have been a continuous subscriber for more than sixteen years, and still think it is the best of its kind. I fully agree with "W. M. B." in the February issue and with "F. H. S." in the March number, as well as with many others since then in regard to asking and answering questions through the Correspondence Department. I want to be counted among those who are helping to "boost" the Correspondence Department higher in its usefulness.

Construction of an Elevated Water Tank

From D. P. Barry, Redford, N. Y.—I am sending herewith sketches which I trust will help "F. J. H.," who asked in a recent issue regarding the construction of an elevated water tank. Fig. 1 is the plan of sills showing location of vertical posts and the eight batter posts which are not indispensable but a wise addition. Fig. 2 represents an elevation of the bent B-C of the plan. Fig. 3 shows the plan of the first platform and would state that the top or tank platform will be similar but with timbers longer to afford a walkway. Fig. 4 indicates the bracing of each pair of batter posts, while Fig. 5 shows the tenon of a brace.

The first story, as I shall call it, is 25 ft. high, including the sills and timbering indicated in Fig. 3, if his timbers are long enough to make that without splicing. The second story is 20 ft. high, including the top platform timbers.

It is not necessary to use batter braces in the second story but if the owner wishes it they may be put in as indicated by the dotted lines in Fig. 2. The braces should be 4 x 4 in. tenoned into the posts and flush on the outsides leaving room for rod holes between. The ¾-in. rods will stand all the required strain.

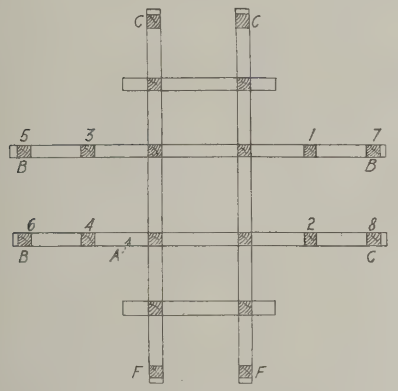


Fig. 1—Plan of Sills Showing Position of Vertical and Batter Posts

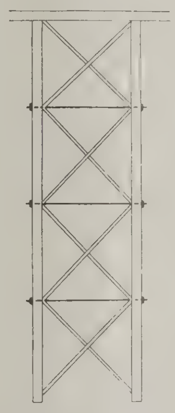


Fig. 4—Bracing of Each Pair of Batter Posts

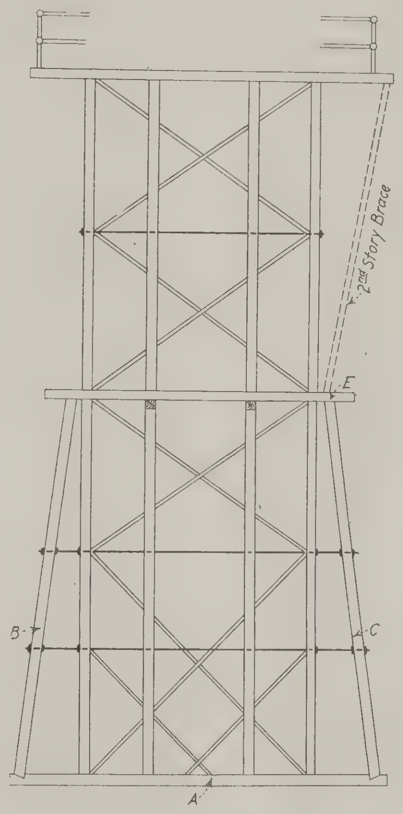


Fig. 2—Elevation of Bent B-C of the Plan

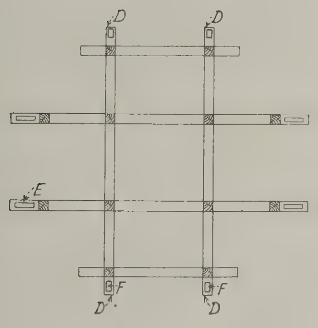


Fig. 3—Plan of First Platform

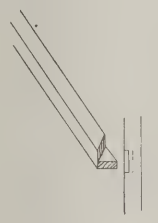


Fig. 5—Tenon of a Brace

Construction of an Elevated Water Tank

The foundation should consist of walls of concrete with field stone filling below grade. The sills, mortises and tenons should be flushed with hot tar oil. The outside end of the wall under the batter posts should be built normal to these posts.

Referring to Fig. 1 the posts marked 1 to 8 inclusive will be 10 in. longer than the others which set under the timbers marked D in Fig. 2 and 3. The bracing may be put in somewhat as indicated. The tank, ladders and minor details do not call for special directions. It is no trifling undertaking and the tower should be put up to stay.

Finding Radius of Circle

From D. G., Winnebago, Minn.—Will some one tell me how to obtain the radius of a circle when the segment, the length of chord and the hight of segment are given. For example, what is the length of the radius of the segment of a circle when the chord is 12 in. long and the hight of rise is 3 in.?

Note.—Add the square of half the chord of the arc to the square of the hight or rise and divide this sum by the rise. This gives the diameter of the circle of which the segment is a part, and dividing by 2 gives the radius. Taking the example mentioned in the letter of our correspondent, 12 in. as the length of the chord and 3 in. as its hight or rise, the operation is as follows:

$\frac{1}{2} \times 12 = 6$

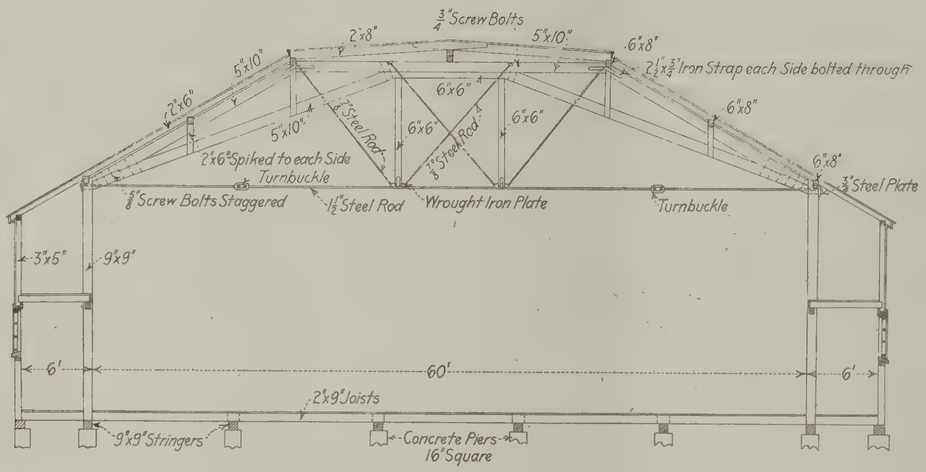
$6^2 + 3^2 = 36 + 9 = 45$

$45 \div 3 = 15$, which is the diameter and

$\frac{1}{2} \times 15 = 7\frac{1}{2}$, the radius.

Is the Roof Truss of Sufficient Strength?

From C. J. M., St. Johns, N. F.—I am sending herewith a blueprint showing truss for the roof of a building about to be erected in this place. I would like to have the opinion of some of the expert roof framers among the readers of *The Building Age* as to its fitness for the purpose. In other words, I desire to know whether it is strong enough or is it too strong.



$\frac{3}{4}$" Screw Bolts
2"x8"
5"x10"
6"x8"
5"x10"
$2\frac{1}{2}$"x$\frac{3}{4}$" Iron Strap each Side bolted through
2"x6"
6"x6"
$\frac{7}{8}$" Steel Rod
6"x6"
6"x6"
5"x10"
$\frac{7}{8}$" Steel Rod
6"x8"
2"x6" Spiked to each Side
Turnbuckle
6"x8"
$\frac{3}{8}$" Steel Plate
$\frac{5}{8}$" Screw Bolts Staggered
$1\frac{1}{2}$" Steel Rod
Wrought Iron Plate
Turnbuckle
3"x5"
9"x9"
6'
60'
6'
2"x9" Joists
9"x9" Stringers
Concrete Piers 16" Square

Is the Roof Truss of Sufficient Strength?

It is intended to place seven such trusses in the roof spaced 12 ft. 9 in. on centers, the timbers to be pitch pine.

Constructing a Small Swimming Pool

From R. H. C., Windsor, N. S.—I have taken *The Building Age* for several years and find it of great help to me in my business as contractor and builder.

I would like it very much if some of the brother chips would give drawings and specifications for a swimming pool about 25 x 40 ft. in size. Will need furnace room, waiting room and dressing rooms—one for men and one for women. Concrete construction is preferred and the building to be one story high.

Note.—In the next issue of the paper it is our intention to illustrate and describe a swimming pool recently built in connection with the Country Club house at Wichita, Kansas. Although somewhat larger in size than that specified by our correspondent above, it is possible he may be able to obtain some suggestions which will prove of interest and value. We shall, however, be glad to have our practical readers furnish the specific information called for by the letter above.

Proportions of a Gambrel Roof

From David Gates, Winnebago, Minn.—I was a reader of your paper for a great many years when it was known as *Carpentry and Building* and I was living in Montello, Wis., then in Madelia, Minn., and now in Winnebago of the same state. I have tried many other building publications but I like *The Building Age* the best of all.

In all this time I have never come to the Correspondence Department with a question owing to the fact that very often others asked the same questions that were puzzling me and the answers given to them served my own purposes. For once, however, I desire to seek assistance and to ask what is the proper proportion to frame a gambrel roof, especially in the case of barns, or is there no rule?

There seems to be no uniformity in the proportion of the different parts of the buildings constructed by the younger class of carpenters. Each one in this section has his own particular proportion of angle to the gambrel of the roof and I would therefore like to know what the readers of the paper have to say in regard to this point.

Besides trying to keep in touch with the progress of the times, I make it a point to help the younger carpenters when I see they are trying to become better workmen by giving them "pointers" and lending them books. As a consequence I loan quite a number of back numbers of *The Building Age* in an attempt to interest them in making progress in their calling and at the same time to induce them to subscribe to the paper for a term of from five to ten years. Some of the older carpenters often say to me, "Gates, you're a fool for helping these chaps, for as soon as they know enough they will buck against you." Well, I can truthfully say that they never have as yet, and if they ever do it will then be time to take a different view of things.

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A Fine California Residence

A contract for the construction of a $150,000 residence for Charles Frederick Kohl at Burlingame, south of San Francisco, was recently let to John MacBain, of Redwood City, Cal. The building, which will be in Gothic style, was designed by Architects Howard & White.

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The wood-using industries require 45 kinds of wood of which 20 grow in Minnesota, and all but three are native to the United States.

Heating Cottage by Hot-Air Furnace

Interesting Example of a Furnace Installation Various Details of Special Interest to the Builder

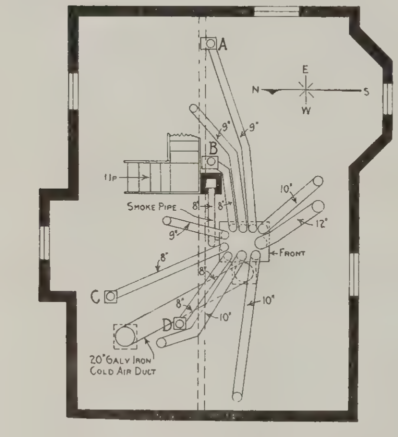
AT this time of the year the householder is as much concerned with the efficiency of his heating plant as he is about the high cost of living. It is always of interest to discover a house that is heated comfortably no matter what may be the type or method of heating, therefore, the accompanying article will be devoted to a description of a Middle Western suburban home heated by a hot-air furnace to the satisfaction of the occupants. The residence in question which is one-and-a-half stories high and embodies pleasing architectural features, is located in South Elmhurst, Ill., a suburb about fifteen miles from the city of Chicago. Especially noticeable are the dormer windows and sweeping shingled roof effects which make for harmony when considered with the frame and stucco sides. The interior layout will especially appeal to those partial to compact and well lighted rooms. Each floor has four rooms, as is clearly shown on the floor plan.

The building has a west frontage, and entering the house from the front porch, one is immediately impressed with the neat arrangements. At the right of the small front hallway is the living room with dimensions of 14 x 18 ft., while to the left of the hall is a stairway leading to the upper quarters. A large clothes closet is provided in the hall for the use of visitors, as is clearly designated on the first floor plan. Leading from the living room is a den or library, 8 ft. square, its exposed side being almost entirely of glass surface. The dining room communicates directly with the living room and is well lighted by a large bay in its southeast corner. This room measures 15 x 15 ft., and has a spacious buffet and china closet provided in the position, as shown in one of the accompanying illustrations. A doorway at the side of the buffet leads to the kitchen, while stairs from the kitchen lead to the basement. The rear entrance is to the kitchen also. The stairway to the second floor is well lighted by two windows at the northwest corner of the house and also the window in the upper part of the front door. The second floor plan includes three nice bedrooms, each with spacious closets, and a bath room that is 8 ft. square.

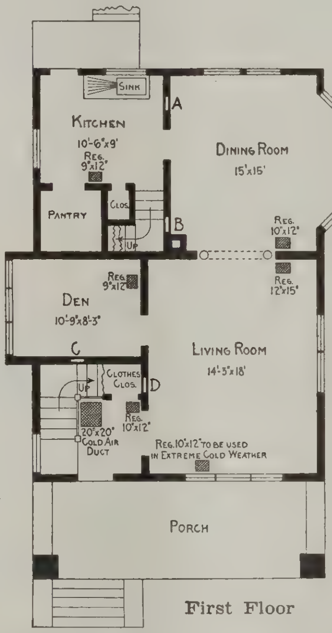
Heating a Cottage by Hot-Air Furnace—Geo. A. Chapman, Architect, Chicago, Ill.

The basement and areas of this home have cement floors of a 3-in. thickness, while the footings are of concrete, composed of a mixture of one part of Portland cement, three parts of crushed stone or gravel, and five parts of sharp Torpedo sand. This is well rammed and coated on the outside walls with a thick wash of Portland cement to fill the crevices, while above grade waterproofed face cement blocks are used. All corners are rock faced and the balance is of tooth chisel design, "Medusa" cement mortar being used in laying the blocks in the wall.

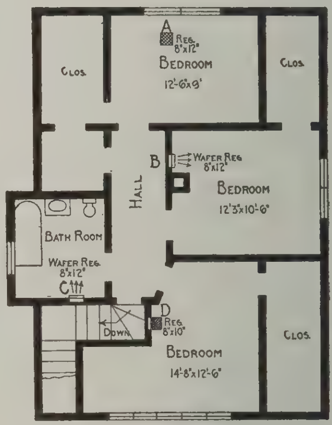
The front porch has a flooring of yellow pine, well painted, and given a generous pitch for drainage. The stairs have 2 x 12 in. treads with $\frac{7}{8}$ in. risers and 2 x 12 in. stringers. The rear porch is also of 4-in. yellow pine dressed two-side and matched. The treads are 2 x 10 in., risers, 1 x 8 in. and stringers 2 x 12 in. The hand rail has a top and bottom rail, all exposed woodwork being painted a dull gray.



Basement Plan Showing Location of Furnace and Run of Heating Pipes

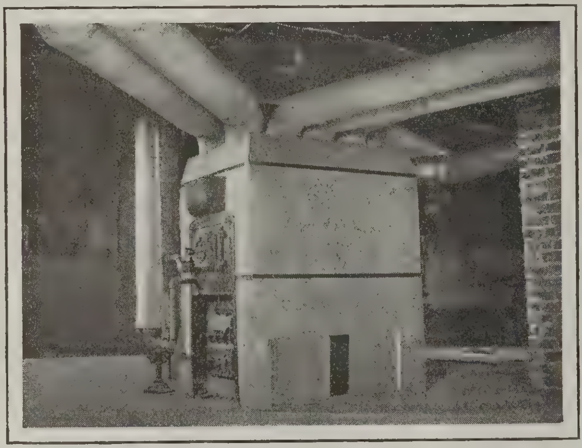


First Floor

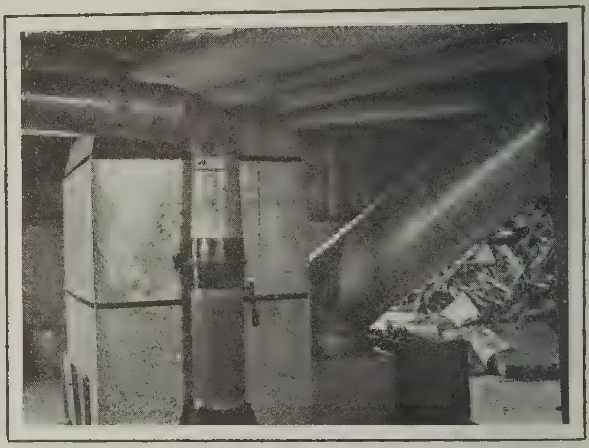


Second Floor

Scale of Plans 1/16 In. to the Foot



View of "Leader" Furnace as it Appears in the Cellar and Showing Pipe Connections



A Rear View of the Furnace Showing the 20-In. Cold Air Duct and the 8-In. Smoke Pipe

Heating a Cottage by a Hot-Air Furnace

The exterior walls have sheathing boards of No. 1 hemlock, 1 x 6 in. shiplap, the roof being sheathed with 1 x 4 in. No. 2 yellow pine. The outside of the house is covered with two coats of building paper, and the shingles used for the roof are of the Star A stock size cedar, laid $4\frac{1}{2}$ in. to the weather, with the last course at the ridge being secured with galvanized iron ridge rolls. All wall plates are 2 x 8 in., leveled and well bedded in mortar, bearing plates being 6 x 8 in., supported on 6 x 6-in posts. The strips laid to receive the metal lath are 1 x 2 in., running vertically, the final coating for stucco effects being "Stone Kote," a product of the Garden City Sand Co., of Chicago.

The first and second floor joists are 2 x 10 in., placed 16 in. on centers, while those for the ceiling and roof are 2 x 6 in. and 2 x 4 in., respectively, also placed 16 in. on centers. The collar beams are 1 x 4 in., placed 32 in. on centers and rafters 2 x 4 in., 16 in. on centers. All headers supporting more than one tail joist are doubled and where headers exceed six feet in length and are not supported by posts or partitions, they are hung in strong, wrought iron stirrups. The wall studs are 2 x 4 in. No. 1 hemlock, 16 in. on centers, doubled at all corners, with double plates at the top and single plates at the bottom. Where partitions are shown, No. 1 hemlock is used, resting on a 2 x 4-in. bearing plate with double plates on bearing partitions.

The inside stairs are built of birch, $1\frac{1}{4}$ x $10\frac{1}{4}$ in., the risers measuring $\frac{7}{8}$ in., stringers 1 x 10 in. and railing of $1\frac{3}{4}$ in. The basement stairs have

1⅛-in. treads with ⅞-in. risers. The floors in the kitchen, bathroom and pantry are 13/16 in. clear hard maple, and the balance of the house selected No. 1 red oak. The front hall, living and dining rooms are sandpapered for a varnish finish, while between the rough and finished floors sheathing paper was used. All exposed plaster angles are protected with corner beads in the usual manner. The hardware throughout is of dull brass with the exception of the bathroom which has all fixtures and hardware fully nickel plated.

Painting is all three-coat work both inside and out, the priming coat on the exterior consisting of Carter's Red Seal white lead and linseed oil. The final coat is of the same lead with selected tints. Sheet metal work received one coat of mineral paint and one coat of lead and oil. All interior woodwork is given one coat of selected oil stain and one coat of alcohol shellac, rubbed with steel wool and finished with one coat of Chicago Varnish Company's pale interior finish.

The house is piped for gas and wired for electric lighting, both systems in accordance with fire underwriters' specifications. Four three-way switches are installed to control the hall lights on the first and second floors, basement light, porch light and wall switches controlling the ceiling lights in the hall, living and dining rooms. Single globes of frosted glass are provided for lighting the halls, while single and combination fixtures have been placed to advantage throughout the house.

All plumbing is installed according to the requirements of local ordinances and is modern in every respect. The water supply is taken through a ¾-in. galvanized iron pipe and proper connections made in the house. A hose connection is carried to the south side of the house. In the basement a 30-gal. galvanized iron boiler, supported on an iron stand, is connected to a coil in the firepot of the furnace. The force and feed pump installed in the basement is connected to the cistern by a 2-in. pipe and also with the tank in the attic. The latter is made of No. 20 galvanized iron, 2 x 6 x 2 ft., with overflow to the basement. The water supply is cross connected so that hard or soft water can be used in the bathroom, kitchen and laundry.

Heating a Cottage by Hot-Air Furnace—View in Living Room Showing the Dining Room at the Right and the "Den" at the Left

For heating the house a No. 55 "Leader" hot-air furnace, manufactured by the Hess Warming & Ventilating Co., 1201 Tacoma Building, Chicago, Ill., is used to advantage. The "Leader" furnace is of square construction as will be seen from the accompanying illustrations showing the general arrangements and run of the pipes in the basement. This type of furnace has 550 sq. in. of fire surface, which is equal to a round firepot of 27 in. inside diameter. Its radiating surface has an area of 66.3 sq. ft., its inner body or radiator being made of soft annealed steel, which assures a more rapid radiation than a cast iron furnace. The basement plan clearly designates the run of the various supply pipes to the first and second floors, the risers to the latter being lettered and easily distinguishable. The furnace is also equipped with chain attachments for regulating the dampers, so that they can be operated from the first floor. The firebox of this type of heater is 22 in. wide and 24½ in. deep, made up of firebrick slabs, resting on steel brackets.

In the hallway on the first floor is a 20 x 24-in. cold air face register for supplying the furnace with cold air from the house through a 20-in. pipe. The cold air supply is also supplemented by the slide at the side of the furnace as will be seen in one of the accompanying illustrations. Beside the cold air face on the first floor immediately in front of the clothes closet is a 10 x 12-in. floor register connecting with a 10-in. warm air pipe. Beneath the west windows in the living room is a 10 x 12-in. floor register that connects with a 10-in. warm air pipe, for use only in extremely cold weather. Running parallel from the furnace are short 10 and 12-in. pipes, supplying the adjacent floor registers in the living and dining rooms, their size being 12 x 15 in. and 10 x 12 in., respectively. The den has a 9 x 12-in. floor register, and is assured of good heat by a short supply pipe 9 in. in diameter. Connection from the furnace to the chimney is made through an 8-in. smokepipe.

The second floor connections are as shown by the lettered stacks. The west bedroom contains an 8 x 10-in. floor register, located just inside the doorway, with an 8-in. warm air supply. Wafer registers, each 8 x 12 in., are supplied in the bathroom and south bedroom with proper connections, and the east bedroom has an 8 x 12-in. floor register with a long supply pipe 9 in. diameter. The registers are black japanned, of types made by the Tuttle & Bailey Manufacturing Co., New York City.

The house here described was erected at South Elmhurst, Ill., from plans prepared by himself, by George A. Chapman, of the firm of A. Holinger & Co., Teutonic Building, Chicago, Ill., at a cost of approximately $3,500.

The contract for the carpentry work was executed by W. J. Rozek, Elmhurst, Ill.

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Process for Fuming Oak

It is a well-known fact that the fuming of oak is done by the vapors of ammonia which act on the tannic acid in the oak, producing the uniform brown color that cannot be obtained with any water, spirit or oil stain in its soft effect. Another advantage of fuming oak is that the grain of the wood is not raised. The process is described as follows in a late issue of the *Painters Magazine*.

If the articles to be fumed are of moderate size an air-tight case or box fitted with racks on which to put the pieces of wood is placed with the open end on a level floor, on which are a number of shallow porcelain or glass dishes filled with ammonia of 26 degrees Baume. The articles are allowed to remain in this apparatus until they have assumed the desired color. When the articles are large, such as furniture, they should be placed in a room of suitable size that must be practically air-tight by having windows and doors securely fastened. There should, however, be a pane of glass in the door, through which observation as to the progress of the fuming may be had without opening the room until the process is complete.

In a room of 12 by 16 ft. the distribution in suitable dishes of one gallon of 26 degrees ammonia over the floor of the room will be sufficient if the room is kept closed for about twelve hours. The articles to be fumed must be so arranged that the ammonia vapors can circulate freely about the surface that is to show the effect of treatment. When the articles are taken from the room or other apparatus they should be given a good airing in order to have the vapors evaporate previous to finishing the wood with wax or paste filler and matt varnish, which is the only proper finish for fumed oak articles of furniture.

When the fuming process is not practicable the effect can be obtained by attaching a sponge to the end of a stick, dipping it into 26 degrees ammonia and so applying it to the surface. Of course, in this case the grain of the wood will be raised more or less and make sandpapering necessary before finishing, as above noted. A solution of bichromate of potash in water, say two ounces of the potash in three pints of water, if applied repeatedly over the surface, will also produce a fumed oak effect. Still better is a wash made by dissolving one ounce of catechu (gambier) in thirty fluid ounces of hot water, permitting the wood to dry and then brushing it over with the bichromate of potash solution referred to above. While these washes do not give quite as good an effect as fuming, they are far better for the purpose than an oil or spirit stain.

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Effect of Paint on Radiating Capacity

The effect of color and finish of the paint used in decorating radiators and in protecting heating pipes has formed the subject of a long series of tests made by Professor C. L. Norton, Boston, Mass. In the nineteenth volume of the transactions of the American Society of Mechanical Engineers the results of the tests are given and these seem to indicate that the loss of radiating efficiency in radiators through painting is less than has been popularly supposed.

Taking for his standard the amount of heat radiated from a new pipe, and placing it at 100, Professor Norton obtains the following relative values for the heat radiated, under similar conditions, from pipe treated as follows:

Loss of Heat

Loss of heat at 200-lb. pressure from bare pipe:

New pipe	100
Fair condition	116
Rusty and black	119
Cleaned with caustic potash, inside and out	116
Painted dull white	120
Painted glossy white	100.5
Painted dull black	120
Painted glossy black	101

From these results the color of the pipe evidently has little or no effect upon the radiation of heat, though the finish, that is dull or glossy, plays quite an important part.

New Publications

Reinforced Concrete Construction, Vol. 2.—Retaining Walls and Buildings.—By George A. Hool, S. B.; 666 pages. Size, 6 x 9-in. Numerous half tone cuts and zinc etchings. Bound in cloth. Published by McGraw-Hill Book Co. Price, $5.00.

Evidence of much care in preparation and practical as well as theoretical knowledge of the subject treated is given in this comprehensive discussion of the methods and principles of reinforced concrete construction. The builder will find much material of interest and value, particularly in those chapters dealing with the subject of foundations, walls and partitions, stairs and "forms." The subject of reinforced concrete bearing walls as employed in concrete residences is given some space, but the greater portion of the chapter is devoted to the more important consideration of curtain walls as employed in connection with steel frame construction in factory buildings, etc. The subject of reinforced concrete stairs receives an unusually careful treatment for a book devoted to a general subject, and the chapter is illustrated with several well executed half-tone cuts and a number of detailed line cuts, showing different methods of placing the bars.

The important subject of "form" construction is dealt with from the standpoint of the practical builder, and a number of valuable suggestions are made, one of the most important of which perhaps is the statement that "although 'form' design in most cases has been left entirely to the discretion of the superintendent or foreman on the job, it has been found by a number of engineering contractors that it pays on large or important work to have the forms designed in the drafting room, provided that such designing work is done under the direction of a man of practical ability. This plan is not only more economical but also eliminates the possibility of a superintendent making an error in judgment which may be serious in a place where computation of strength is the only means of determining the proper spacing of the support. If 'form' drawings are made, the lumber may then be ordered direct from the mill to exact widths and even foot lengths and, in cases where forms are of fairly uniform sizes, it is possible and sometimes a great advantage to order the lumber to the exact length in which it is required.

The subject of reinforced concrete roofs receives a somewhat cautious treatment and the writer evidently considers this type of roof covering to be still in the experimental stage. The chapter on foundations is devoted very largely to the subjects of column footings and concrete piles.

The scope of the work is outlined in the statement that it deals principally with reinforced concrete buildings of the skeleton type of construction in which there is an exterior as well as an interior frame of reinforced concrete, and in which the walls are simply light curtain or panel walls of either concrete or brick. A chapter is included dealing with the construction plant and this is followed by a discussion of estimating which is made more valuable by a detailed example of an estimate for a concrete building where the actual method of computation is well shown.

A Manual of Standard Wood Construction

All engineers and architects using wood as a structural material have of late years labored under a handicap owing to the fact that all tables pertaining to the strength of the timbers are based upon the nominal size of the timbers. These nominal sizes do not exist commercially as they are reduced by dressing to what are termed the "actual sizes." It is not necessary to enter into the reasons for this, as it is a condition that exists. We do not expect to procure 13″ and 14″ steel I-beams for the reason that they are not standard nor rolled by any manufacturers—it is also a condition that exists.

In order that designs for the use of Yellow Pine for structural purposes may be made intelligently and economically the Yellow Pine Manufacturers' Association have had prepared, and issued for free distribution, a handbook containing information pertaining to their products.

This fourth edition confines itself to Southern Yellow Pine exclusively, and aims to give information not obtainable in any other publication, with a short digest of the results of authentic tests and recommended working stresses by various authorities. In many respects the work follows the lines of the Cambria and Carnegie handbooks, and aims to be to the lumber industry what the above mentioned handbooks are to the steel industry. The book is not intended to be a text-book, but rather to supplement such books with specific data pertaining to Southern Yellow Pine.

In this edition such tables as were incorporated in previous editions and used in this one, were entirely recalculated and rearranged in form. The present form is believed to be more useable. All tables are based upon the actual size of dressed timbers as manufactured by the Yellow Pine Manufacturers' Association in accordance with their Standard Rules for manufacturing and grading their products. In this connection it can be said that 95% of the Yellow Pine lumber produced in Missouri, Arkansas, Texas, Louisiana, Mississippi, Alabama, Georgia, and Florida is manufactured and graded in accordance with these standard rules.

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New York City Planning Exhibition

Possibly city planning would have been more effective at an earlier period in the country's history, for there are some who believe that the growth of one or two of the older cities of the United States has actually been retarded by the narrow, crooked streets and irregular building plots which have been inherited from former generations. That much can be done, however, to redesign a city was shown in the city planning exhibition held at the New York Public Library, November 24 to December 14, under the auspices of the Heights of Buildings Committee of the municipality. One of the avowed purposes of the exhibition was "To show the taxpayers that right city planning is not a waste of city money, but that it is one of the best investments that a city can make." Addresses were delivered by persons prominent in fields relating to the general subject. Many European cities were represented either by official exhibits or those of private interests.

Combination Woodworkers for Builders

Salient Features of Machines of Special Interest to the Builder Operating a Small Woodworking Shop

EVERY building contractor who operates a woodworking shop is interested in maintaining an equipment which will enable him to turn out the various kinds of work that he may be called upon to execute in a most expeditious, economical and satisfactory manner. It may be that his business is such that he only requires a shop equipment ranging anywhere from three or four up to eight or ten labor-saving devices, but among the number he usually includes what is known as a combination woodworker—a machine upon which many different kinds of work may be produced and which really constitutes several machines in one. Sometimes this machine is of such a nature as to be a fixture in the shop, while in other cases it can readily be moved about within the building. In still other cases the builder may utilize a portable saw rig embodying many of the features of the fixed machine but capable of being readily transferred from the shop to the outside job and there perform its functions, after which it is moved to another job and the operations repeated according to the requirements of the work in hand.

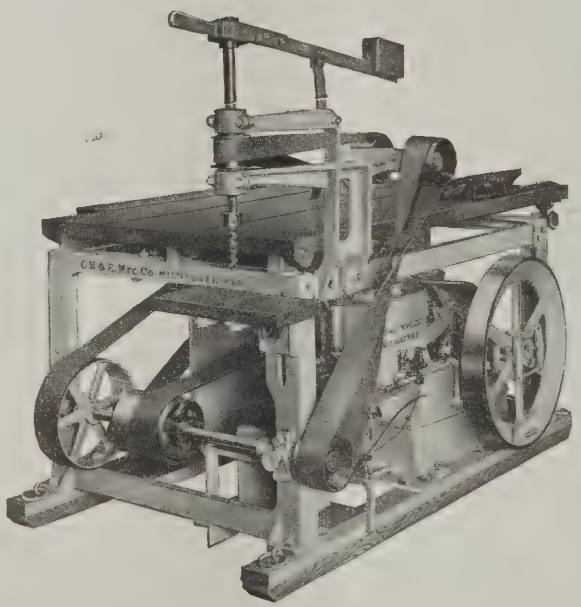

Fig. 1—General View of an All-Iron Portable Saw Rig

Since the first introduction of machines of the character described there have been important developments all along the line, with the result that the combination woodworker as at present on the market is a reliable and efficient machine that may be depended upon to perform its work in an entirely satisfactory manner. A brief review of some of the salient features incorporated in leading makes at present available cannot fail to interest the builder and the carpenter-contractor who is operating a small woodworking establishment, and who perhaps desires to supplement his present facilities with additional equipment. Several of the machines referred to in what follows are of a nature to permit of several operations being performed at the same time by as many different men, each carrying on his work without interfering in any way with the others.

One of the latest candidates for popular favor in the way of a labor-saving device is the all-iron portable saw rig illustrated in general view in Fig. 1 and especially designed for doing a great variety of work on the job, including the sawing of lumber for use as "forms" in connection with heavy concrete construction. This outfit is designated as the "latest and newest triumph in a combination portable woodworker" and having a capacity of 6 in. lumber on the rip saw and 8 in. lumber on the cross-cut saw. The engine and saw table are mounted on 4 in. channel iron skids reinforced with 4 x 4-in. yellow pine. The end frames of the saw table are of cast iron, and on these is mounted and hinged an accurately planed iron table measuring 42 x 66 in. in area with screw adjustment for raising and lowering. An important feature of this machine consists in running a belt from the engine flywheel to a tight and loose pulley on the countershaft and from the countershaft to the arbor pulley, thus making it possible with the double belt arrangement to bring the saw and boring outfit, as well as the jointer, to a standstill without the necessity of stopping the engine. The 6-horsepower water-hopper cooled gasoline engine is the makers' very latest design and under break test is said to have been made to pull 7¾ horsepower.

The boring attachment is of the vertical type, being operated from a pulley mounted on the end of the countershaft. This boring attachment is fastened to the main saw table with three bolts. The machine as represented in Fig. 1 shows the boring attachment mounted. The jointer has a 6-in. cylindrical head with four knives installed and operated on the side of the table opposite to that to which the boring attachment is fastened. An iron adjustable jointer gauge is supplied with the jointer attachment. An iron rip gauge is adjustable from square to miter in either direction and can be used on either side of the saw, being controlled on a slide at the end of the table. The iron cross-cut gauge is also adjustable from square to miter in either direction and can be used on either side of the saw. This all-iron portable saw rig has just been placed on the market by the C. H. & E. Mfg. Company, 330 Mineral Street, Milwaukee, Wis., and its net weight is given as 1900 lb. There are five different sizes of portable saw tables which can be used.

A combination woodworker so constructed that three men can operate at the same time and possessing such an arrangement that the various adjustments necessary for performing the different operations for which it is fitted can be quickly and easily accomplished, is illustrated in general view in Fig. 2 of the engravings. Strength, capacity, variety and small floor space are the distinctive features of the machine, which is regularly made up with a combination iron and wood top, but it can be furnished with an all-iron top when so desired. There are three main elements, first, the lathe, which is also used for boring, tenoning, drilling and sanding; second, the large band saw, and third, the arbor embodying circular saw, planer, jointer and arbor. The main drive is controlled from either side of the machine by means of a convenient lever. The machine covers the every-day operations of the builder, the carpenter-contractor and general repair man with thoroughness and speed. It is known as the Buffalo Crain Combination Woodworker and is offered by the Buffalo Forge Company with main office at 490 Broadway, Buffalo, N. Y.

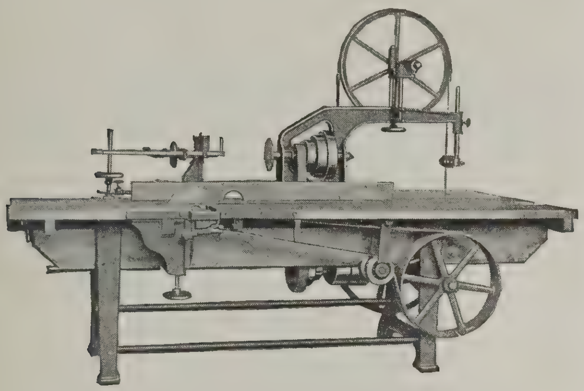

Fig. 2—The Buffalo Crain Combination Woodworker

Another machine which cannot fail to interest the wide-awake and progressive builder and one which is of such construction that four men can work on it at the same time without interfering with each other is the Crescent Universal Woodworker, which is presented in Fig. 3. As here pictured the boring attachment is converted into a disc grinder. The combination of machines, so to speak, are each independent of the other, are arranged compactly and are self-contained so that all may be driven by one main belt from the line shaft. It will be seen from an inspection of the picture that the two drive shafts are so located on the base as to be entirely out of the way. With this machine the operator can do band and cross-cut sawing, jointing, shaping and boring, there being provided in the outfit either a 26-in. or 32-in. band saw, an 8-in., 12-in., or 16-in. jointer. One attachment converts the borer into a hollow chisel mortiser suitable for cutting mortises up to ⅝ in. square. The arrangement of parts is such that a panel raising attachment can be used if desired, also a tetoning attachment. The base of the machine is made in a single casting with planed surfaces upon which the various parts are mounted. It is provided with three large casters which make possible the easy transfer of the machine from place to place, and it is furnished either to drive from a line shaft or by an electric motor. This Universal woodworker, which is made by the Crescent Machine Co., 206 Main Street, Leetonia, Ohio, will allow builders and carpenter-contractors to get out much of their own mill work, thus enabling them to figure closer on contracts and at the same time make a larger percentage of profit.

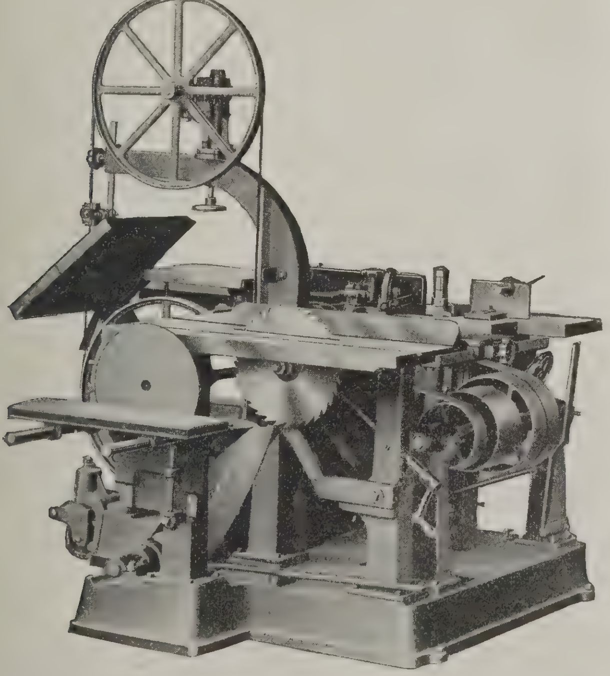

Fig. 3—Perspective View of the Crescent Universal Woodworker

A machine in which the builder or carpenter-contractor who values ample power and good tools cannot fail to find interest is the portable combination woodworker illustrated in Fig. 4 of the engravings. It represents the results of years of experience and the sole aim has been to so construct a machine that it will give entire satisfaction during years of continuous service. The new model known as the "Standard" comprises nine distinct woodworking machines in one; namely, cut-off saw, dado head, rip saw, molder, jointer, jig saw, sander, boring machine and emery wheels, all operating on one shaft with the exception of the jig saw, which is driven by an eccentric belt from the mandrel. The point is made that there are no springs, cogs, gears or similar devices to get out of order and that the changes from one attachment to another can be made with great rapidity. The picture represents the machine with dado head and boring attachment as made by the Atlantic Engine Company, Meadville, Pa., and is operated by the company's latest type

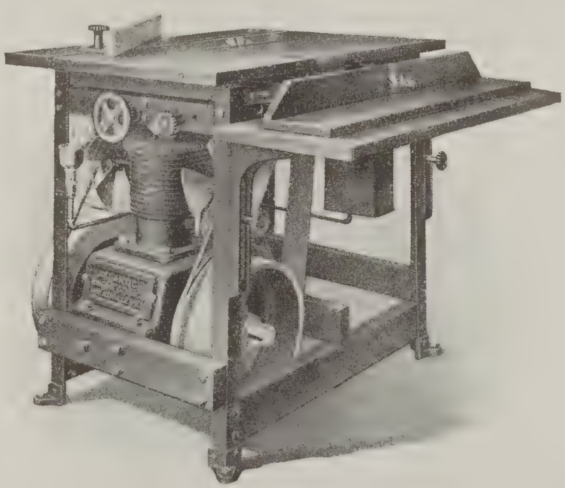

Fig. 4—The "Standard" Portable Combination Woodworker

of air-cooled engine designed especially for this portable combination woodworker.

The builder or carpenter-contractor who has frequent use for a machine permitting five men to work on it without interfering one with the other will find much to command his attention in the Famous Universal Woodworker illustrated in Fig. 5 and made by the Sidney Tool Co., Sidney, Ohio. The various parts of the machine are independent and each can be started or stopped without interference with others. The main frame is cast in one piece, giving a substantial foundation for the various operating parts and attachments. The operator will find the band saw to be of the right-hand type with tilting table, manipulated separately and available in either the 27-in. or 32-in. size. The saw table, like the jointer and the band saw, is driven from the main driving shaft within the machine and is started and stopped by friction clutch pulley. The table tilts to an angle of 45 degrees and raises and lowers for grooving and slot cutting. There is a wooden throat around the saw for 2-in. dado heads. The borer is so arranged as to embody the hollow chisel mortising attachments as well as a number of other attachments adapted to be operated on the borer. The shaper is of the single spindle reversible type and has the raising and lowering arbor. The jointer is of the standard type, with all adjustments, and is available in either 12 or 16-in. widths or with either the square or round head. The picture which we show is a dimension view of the machine all ready for operation.

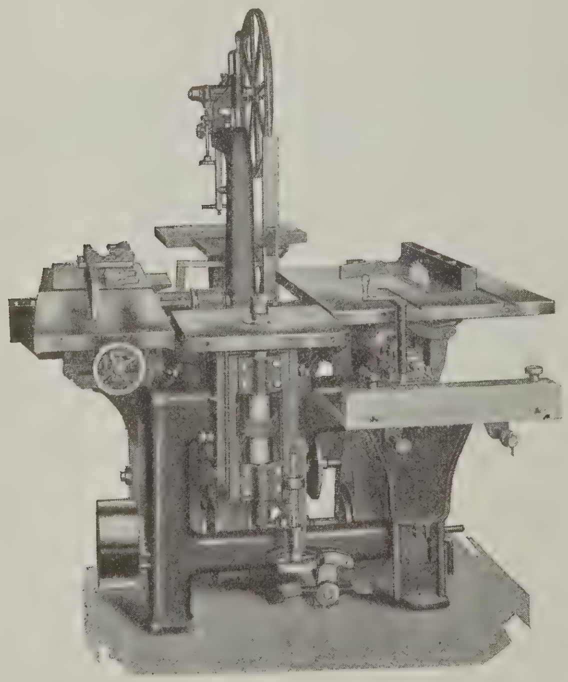

Fig. 5—The Famous Universal Woodworker

A portable saw rig which combines in one machine a jointer, sander, rip saw, jig saw, cross-cut saw and boring attachment is portrayed in Fig. 6. It is mounted upon skids which with the frame and table are constructed from rock maple, thus reducing liability of shrinkage or warping to a minimum. The standards or legs are made $3\frac{1}{2}$ in. square and the table is 42 in. long constructed of $1\frac{1}{2}$-in. squares. It is also held by four long bolts extending through the entire width of the table. The skids are $2\frac{1}{2}$ x $5\frac{1}{8}$ in. in cross-section on which is constructed a 1-in. rock maple floor. The frame complete stands 36 in. high. The jointer is attached to the table on the end of the arbor opposite the saw so that both attachments may be used at the same time. The arms for the 12 in. jig saw are made of rock maple and connect with turnbuckle to adjust the tension of the saw. All working parts are brass bushed, the power arm being made of malleable iron. The boring table of the machine is so arranged that the back may be detached and the bottom used with the sander. The boring attachment on this saw rig is constructed of semi-steel with two 1-in. steel guides which support the moving table. The lowering and raising of the table is accomplished through dovetailed guides which can be set at any desired hight by a hand wheel. The sliding table is made from $\frac{3}{4}$-in. rock maple and is 24 in. long by 6 in. wide by 4 in. high. The motive power is furnished by an engine of special design built by the Oshkosh Mfg. Company, Oshkosh, Wis., also the makers of the "Eveready" portable saw rig, by which the apparatus here described is known to the trade. The engine is of the four-cycle type—said to be the best type for operating the saw rig.

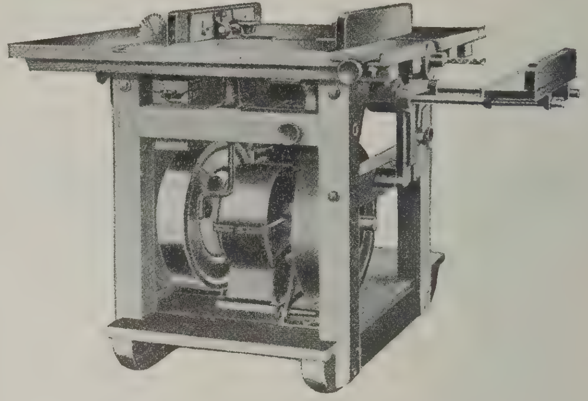

Fig. 6—The "Eveready" Portable Saw Rig

A machine which the builder will find convenient as a unit of his shop equipment is a variety saw, a type of which we show in general view in Fig. 7. This is one of the more recent productions in the saw line for variety cutting of all kinds, special care having been taken in the design and construction so as to facilitate the work of making the adjustments. It is, therefore, time-saving in operation, economical in power consumption and is sufficiently strong to give long service. The picture here presented clearly shows the boring attachment which is similar in construction and capacity to the hollow chisel mortising attachment except that the chisel holder, front fence and foot treadle are eliminated. As the boring bit pulls in the work the treadle is not required. The column is a heavy one-piece cored casting carrying the table yoke which is mounted in gibbed ways. It is so designed that the countershaft may be placed either on or under the floor. A cast iron hood and chute guards the lower part of the saw blade and effectively removes all sawdust. With a 12-in. blade the machine will rip stock up to 3 in. thick, $17\frac{1}{2}$ in. to the right and 16 in. to the left, or will cut off stock up to 1 in. thick and 18 in. wide. It is made in two sizes and the table may be tilted to an angle of 45 degrees. The raising screw has ball bearings. Mention may be made of the fact that the hollow chisel mortising and boring attachments will mortise or bore from ¼ in. to ¾ in. and 3 in. deep in stock up to 16 in. by 8 in. The table is 19 x 10 in. and is carried on a cast iron frame which has a vertical adjustment of 8 in. on a heavy dovetail slide by means of a screw of large diameter. The table moves 5 in. on dovetailed slide by means of a foot treadle and iron links with stop for regulating the depth of mortise or boring. The chisel is carried in a cast iron holder or ram and is easily changed. A boring bit is used in place of the hollow chisel when boring only is to be done. This machine is made by the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio, which concern has also made a similar machine but with a smaller table and the fence equipment is not so elaborate.

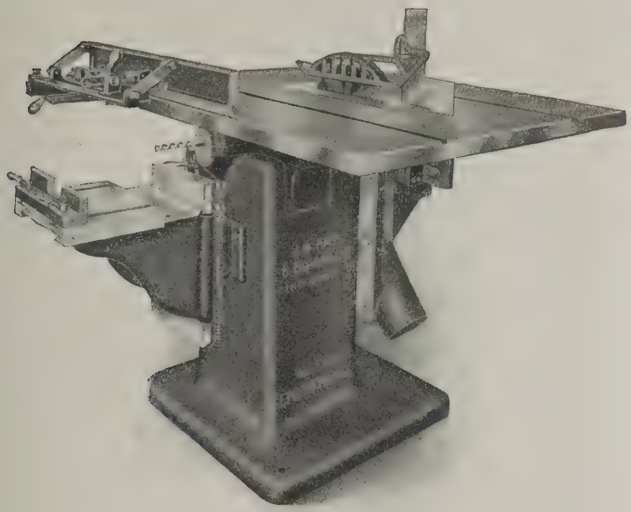

Fig. 7—General View of Variety Saw

In cases where work is to be done directly at the site of the building operation the machine shown in Fig. 8, which is capable of accomplishing a large variety of light and medium work, is likely to appeal to the building contractor. This is in effect a four-man machine; that is, four workmen may perform as many different operations at one time without interfering with one another. The outfit includes rip saw, cutoff saw and mitre saw, dado machine, grooving machine, rabbitting machine, tenoning machine, jointer or planer, matcher and molder, boring machine, drum and disc sander, emery wheel, jig saw. The standard equipment is quite complete, covering all ordinary requirements, but extra cutters for the molder can be furnished in sets on order. This machine is furnished with a 7-h.p. gasoline engine or with a 3 or 5-h.p. electric motor, according to the conditions and the work contemplated. In either case the motive power is mounted on the same base. The frame is of 3½ x 3½-in. hard wood, mortised and bolted. The top, 30 x 54 in., is of ribbed iron, raised or lowered by a hand screw, and fitted with side clamps. There is an adjustable ripping gauge with a tilting fence for bevel sawing and rapid fine adjustment and positive lock in any position. The machine is designed to rip a 26-in. plank through the center without removing the saw guide. The cutoff gauge slides in a planed groove the full length of the top and can be set to cut squares, miters or any angle. For cross cutting all gauges above the table can be quickly removed. The arbor is of 1 5/16-in. steel, running in chain-oiling babbitted bearings held in alignment by a heavy cast iron yoke and has a capacity for saws up to 16 in. diameter. The 3½-in. belt (direct from motor or engine to arbor pulley) has a belt tightener with spring take-up. This equipment is known as the "American" contractors' portable variety woodworker and is manufactured by the American Sawmill Machinery Co., Hackettstown, N. J.

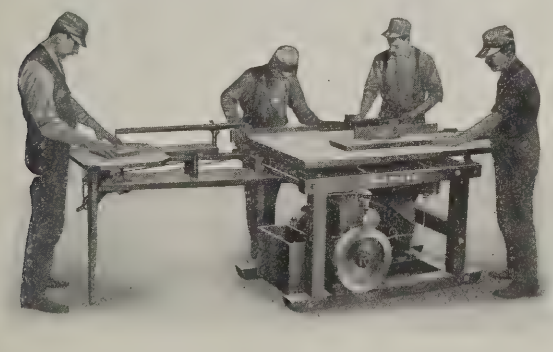

Fig. 8—Portable Saw Rig, Showing How Several Men May Work on it at the Same Time

There is at present on the market another combination machine embodying features of a special nature and which permits of the addition of many attachments. It can be operated with electric motor or gasoline engine, according to requirements. A general view of this machine which is made by the Parks Ball Bearing Machine Company, Cincinnati, Ohio, is presented in Fig. 9. It embodies in reality eight machines which are among the most useful and necessary in a woodworking establishment and these stand out ready for instant use. With this combination machine the operator can cross cut a board and immediately rip, mold or joint, bore and tenon; then turn to the band saw and shaper, or six men could actually work on the machine at the same time. An inspection of the picture will show that the frame is of such a nature that it may be rigidly fastened to the floor of the shop or it may be mounted upon a truck and carried from one outside job to another, thus greatly facilitating the execution of various kinds of work required at the site where a building is in process of erection. The swing cut-off saw lever may be operated by means of a hand lever or a foot treadle, the operator standing on the left side of the machine so that the cut-off saw will swing back behind the band saw and below the table surface. The point is made that this combination machine is especially adapted for a portable outfit as it is arranged so that the builder may take any parts or attachments to make up the combination which he desires and then add the engine or motor all on the same base. The band saw table clears the top of the circular saw table 7 in. and can be taken off by loosening one hand wheel or the whole attachment can be taken off by loosening three bolts. The band saw legs are 17 in. out of line of the circular saw and the front leg is in the rear of the circular saw mandrel 17½ in. The swing cut-off saw is 6 ft. 4 in. from the front edge of the rip saw and the shaper spindle is 13 in. from the band saw. From the front edge of the jointer plates to the rear end of the swing cut-off saw is 9 ft. 4 in., while the total width from the outside edge of the shaper table to the left side of the circular saw table is 56 in., the width of the table proper being 44 in.

A 3-in. jointer can be used on either side of the makers double table machines outside of the bearings, or a 6-in. with four-sided head and two straight knives on the right side of the table can be used in place of the 3-in. which is especially adapted for rabbeting, molding, etc., and with a side cutter can make tenons 6 in. long. The tilting guide is easily adjusted from 0 to 18 in. and tilts to 45 degrees. It slides over the jointer and can be used for circular saw; also can be instantly taken off by loosening one hand wheel on the under side, leaving a level table surface for cross-cut work. The boring attachment consists of an adjustable sliding support to hold the material being bored and a chuck attached to the end of the saw mandrel. It is intended to take ½ in. round shank bits and drills. There is provision for regulating the depth to bore, and it can be lowered to take in 2¼ in. below the center of the bit.

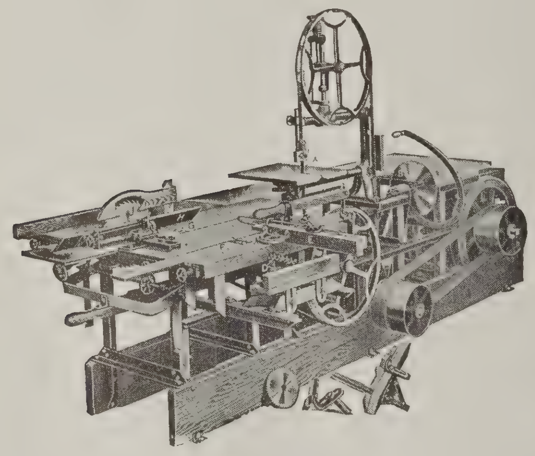

Fig. 9—The Parks Ball Bearing Combination Machine

A woodworking machine in which a number of important improvements have recently been incorporated is known as Type "C," shown in Fig. 10, and made by the Tannewitz Works, Grand Rapids, Mich. It includes a hollow chisel mortising attachment as one of the four machines which go to make up the woodworker. This attachment will be found very convenient for the builder operating a woodworking shop, for by means of it the mortises as well as the tenons of screen and other doors can be readily turned out. The other three machines consist of a band saw, a jointer and a saw bench. The picture here presented shows the woodworker complete with hollow chisel mortising attachment ready for work. The saw bench table is 24 in. square and the hight of the table above the floor is 34 in. The band saw frame is cored hollow and is very stiff. The upper band saw wheel has a vertical adjustment of 5 in. and is provided with spring tension for the blade. The band saw frame swings on a hinge to one side by simply loosening a nut and the operator can rip to the middle of stock 36 in. wide. The jointer tables are 10 x 36 in. in area, have a vertical adjustment of 1 in., and are cut away for using molding and rabbeting knives. The length of the boring bits over all is 6 to 8 in. and the size of the boring table is 10 x 12 in., with 3-in. vertical adjustment and a 4-in. travel back and forth and sideways.

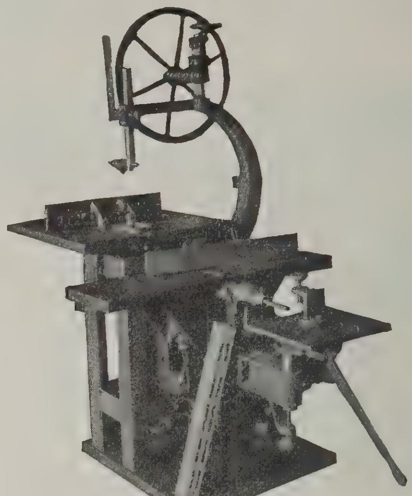

Fig. 10—Type "C" Tannewitz Wood-Working Machine

Another portable saw rig which will be found of use to the carpenter-contractor and builder under certain conditions is that shown in Fig. 11 and known as the "Elliott." It is of such a nature as to be readily moved about from one job to another and consists of a tilting saw table strongly made of angle iron operated by an Elliott hopper cooled engine and mounted on a special steel truck, the entire arrangement being clearly indicated in the picture. Particular attention is directed to the manner in which the sawing attachment is mounted, this being such as to render it convenient for sawing long pieces of building stuff, such as studs, joists, rafters, plates, sills, etc. The engine with which the outfit is equipped ranges in size from 4 to 8 hp., a 24-in. saw being used with the 4-hp., a 26-in. with the 6-hp., and a 28-in. saw with the 8-hp. engine. The outfit is made by the Kansas Engine Works, Central Avenue, Kansas City, Mo.

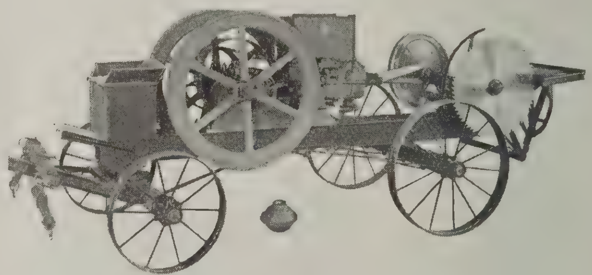

Fig. 11—The "Elliott' Portable Saw Rig

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It is expected that the new National Library building, work upon which has just been commenced at Florence, Italy, will require something like five years to complete and will cost in the neighborhood of one million dollars. In addition to housing a great quantity of manuscripts and historical documents, old sketches, drawings, etc., the library will have a capacity of more than 1,000,000 books. The architect of the work is Cesare Bazzani.

Current News of Builders' Exchanges

New Organizations—Annual Meetings—Election of Officers—Occupying More Commodious Quarters

Atlanta Builders' Exchange

In order to meet the growing demands of the organization the Atlanta Builders' Exchange, Atlanta, Ga., has recently occupied more commodious quarters in the Candler Building, and efforts are being made to induce more of the members to locate there. The Exchange issues a weekly bulletin which is intended to show prospective business so far as may be possible and give information that is likely to prove interesting to the members, of which there are 135 on the rolls.

Secretary S. D. Wood has compiled and issued a directory of the Exchange which is the largest and most complete that the organization has ever compiled. The membership is classified according to the particular branches of the building business in which they are engaged and there is given not only the street address but also the telephone call. The Exchange was organized April 30, 1908, and has established for itself an important place in the business world.

The quarterly meeting and luncheon was held in the M. & M. Club in the Candler Building on Wednesday evening, November 19, at which time many matters of mutual interest were discussed. There was a good attendance and after the meeting was over everyone felt glad that he was present on that occasion.

In accordance with a resolution passed at the last quarterly meeting President Rose has appointed what is to be known as the Atlanta Products Vigilance Committee. It consists of R. M. Walker, chairman; C. G. Bradt, D. A. Farrell, B. Mifflin Hood and F. H. Reynolds. The duty of this committee is to look after the interests of the membership in local construction work when competing with out-of-town concerns.

Officers of Canton Builders' Exchange

The annual election of the Canton Builders' Exchange, Canton, Ohio, was held on December 5, when officers for the ensuing year were chosen as follows:

President	E. J. Lander
Vice-President	J. E. Raber
Secretary	Charles R. Kumpf
Treasurer	M. P. Wilson.

William T. Kirk was chosen as assistant secretary and J. A. Jeffers was appointed consulting attorney.

Chicago Builders' and Traders' Exchange

The thirtieth anniversary banquet of the Builders' and Traders' Exchange at Chicago will be held on the evening of Thursday, January 8. It will be designated as Past-Presidents' Night and it is expected that all living past-presidents of the organization will be in attendance.

On Tuesday, January 20, the annual meeting of the Exchange will be held, when officers for the ensuing year will be chosen and other business transacted.

The Builders' and Contractors' Association

The above is the name of a new organization formed on the west side in Cleveland, Ohio, which is intended to cover all of Cleveland and its suburbs. The organization will limit its membership to men engaged in the carpentry contracting and building business, leaving out masonry contractors and material men. The Association started with a membership of sixty, but it is estimated that there are 400 in Cleveland and its suburbs eligible to membership.

The Association will co-operate with the Cleveland Builders' Exchange and its activities will be directed largely toward protecting the interests of builders of small homes. It will attempt to have some changes made in the present city building code that will be to the interest of builders of small dwellings.

The annual banquet of the Contracting Painters' Association, Cleveland, Ohio, was held at the Gillsy Hotel in that city, December 10. The Association has reelected its old officers. These are Conrad Krause, president; H. W. Kemmerling, vice-president, and W. S. Sobie, secretary.

Detroit Builders' and Traders' Exchange

At a recent meeting of the Ex-directors' Club of the Builders' and Traders' Exchange of Detroit, the event was celebrated with a dinner at the new Idelweiss Café. Those present were entertained by W. R. Kales with an interesting account of his trip around the world from which he recently returned. His remarks were illustrated with numerous photographs taken by him while on his journey.

During the winter months the Exchange will have two bowling leagues to be known respectively as No. 1 and No. 2. The first bowls every Wednesday afternoon from 3 to 5 o'clock and the other bowls every Thursday afternoon during the same hours. Each league is composed of six teams of five men each, and each series of games consists of three contests. Ten series will constitute the first half of the season and ten the second half of the season. The teams in each league winning the team prize for the first half will bowl the team winning the prize in the second half at the conclusion of the regular games, unless one team wins the team prize for both halves. The Exchange has recently issued the rules governing the contest, together with a list of the members of each team. The prize for the winning team in each league is a silver cup.

Hal H. Smith, of the Exchange, made an address at the annual banquet on December 18 of the Pittsburgh Builders' Exchange, the subject being "Employers' Liability and Workmen's Compensation." The operation of the Michigan law has attracted wide attention and Mr. Smith, being a member of the commission largely responsible for the present law in this state, is well posted on the subject, and showed the Pittsburghers what the Wolverine State is doing in taking care of its workmen and at the same time conserving the interests of its employers.

The Master Plasterers' Association, at its regular meeting in the rooms of the Builders' and Traders' Exchange, on December 10, took up the matter of a Uniform Contract, and the secretary is now in correspondence with other cities to obtain copies of the contracts used by other Master Plasterers' Associations, with a view to obtaining up-to-date information on what the other plastering contractors are doing in that regard.

Considerable discussion was indulged in over the theft of materials and tools from the various jobs, some of the contractors claiming that they suffered a constant loss in this way which amounted to a goodly sum in a year. The abuse is being carried to such an extent that some plan for better protection will be considered.

A membership campaign will be staged by the plasterers after the new year dawns, it being the intention of bringing every desirable master plasterer into the association if possible.

◆

The Builders' Exchange of Montreal, Canada, issues an official organ known as the *Builders' Bulletin* and containing much information to the members as well as to others identified with the building business in that locality.

A Brief Review of Building Situation

Figures Showing Building Activities in Leading Centers Based on Permits Issued in November, 1913, and November, 1912

THE constant pressure of a difficult loan market has gradually brought all sections of the country into line and with very few exceptions the volume of building permits issued in the various cities during November, 1913, falls far short of November last year—the total being over 25 per cent. Of the large cities of the northeastern portion of the country, Boston has a loss of 70 per cent., while New York sustains a loss of 50 per cent. Washington loses 20 per cent. and Baltimore 8 per cent. Philadelphia and Pittsburgh are the only two of the larger cities of this section which do not record losses—gains of 5 and 1 per cent. respectively, being shown. Albany shows a loss of 37 per cent. and Buffalo 31 per cent. Harrisburg makes a notable gain of 49 per cent. over the figures of November, 1912, while Hartford, Conn., gains 297 per cent.; Manchester, N. H., 81 per cent., and Wilkes-Barre, Pa., records a gain of 109 per cent. Scranton shows a gain of 1 per cent., Newark loses 22, New Haven 33, Paterson, N. J., 22, Rochester, N. Y., 33, Springfield, Mass., 81, Syracuse 54, and Worcester, Mass., 59 per cent.

Northeastern Cities

City	Nov., 1913	Nov,, 1912
Albany	$277,855	$443,828
Baltimore	612,796	668,871
Boston	1,063,225	3,567,235
Buffalo	580,000	836,000
East Orange	117,303	199,505
Harrisburg	84,800	57,480
Hartford	1,070,845	269,475
Manchester	150,234	82,801
Newark	549,371	706,806
New Haven	214,475	321,328
New York	6,847,766	13,787,972
Paterson	81,030	103,982
Philadelphia	2,026,565	1,919,880
Pittsburgh	698,617	694,329
Rochester	649,575	968,503
Scranton	156,625	154,260
Springfield	41,425	215,150
Syracuse	182,330	396,810
Washington	644,033	810,867

Several cities of the north central portion of the country made gains over November of last year, among them being Cleveland, with a gain of 1 per cent., Columbus, Ohio, 61 per cent.; Detroit, 14; Grand Rapids, 15; Milwaukee, 4; Peoria, 95, and Toledo, 4 per cent. In the case of Milwaukee the favorable showing is partly due to the permits issued for the Washington Park High School, a $400,000 structure to be erected in that city. Chicago records a loss of 15 per cent. and Cincinnati 13. Akron, Ohio, loses 56 per cent.; Dayton, Ohio, 81; and Evansvile and Fort Wayne, Ind., lose 25 and 38 per cent. respectively.

North Central Cities

City	Nov., 1913	Nov., 1912
Akron	$173,135	$397,980
Chicago	6,490,700	7,625,000
Cincinnati	457,050	526,145
Cleveland	1,241,640	1,230,812
Columbus	398,770	247,987
Dayton	111,975	593,078
Detroit	1,769,900	1,548,085
Evansville	103,405	138,675
Ft. Wayne	102,150	165,635
Grand Rapids	275,384	240,240
Indianapolis	479,711	700,085
Milwaukee	1,711,300	1,643,605
Toledo	283,555	272,270

The depression is pretty general over the southern section of the country, and large losses are numerous. Atlanta records a falling off of 77 per cent.; Chattanooga, Tenn., 67; Birmingham, Ala., 17; Louisville, Ky., 25; Memphis and Nashville, Tenn., losses of 64 and 69 per cent. respectively, while New Orleans loses 29 and Richmond, Va., 20 per cent. Shreveport, La., shows an increase of 2 per cent. over November, 1912.

Southern Cities

City	Nov., 1913	Nov., 1912
Atlanta	$278,904	$1,238,281
Birmingham	289,780	349,391
Chattanooga	38,610	118,185
Louisville	184,910	258,530
Memphis	211,261	588,505
Nashville	78,946	256,958
New Orleans	139,716	197,980
Richmond	281,399	358,044
Shreveport	89,350	87,520

Of the western cities, Salt Lake City redeems the unfavorable showing made in previous months by a gain of 73 per cent. over the figures for November, 1912. Minneapolis shows a healthy condition by an increase of 16 per cent. Cedar Rapids, Iowa, and Dallas, Texas, make notable increases of 179 and 175 per cent. respectively, while St. Joseph, Mo., follows with an increase of 44 per cent. and Sioux City, Iowa, of 8 per cent. Wichita, Kan., jumps into prominence with a gain of 402 per cent. over the figures of November, 1912.

Tacoma shows a loss of 60 per cent. and Seattle of but 4 per cent. Portland loses 6 per cent., while San Francisco and Spokane show losses of 40 per cent. Denver records a loss of 51 per cent., Los Angeles 54 per cent. and Oakland 58 per cent. St. Louis almost exactly equals its figures of November, 1912. Topeka, Kan., records a loss of 47 per cent. Duluth loses 48 and Kansas City 42 per cent., while Omaha decreased 17 per cent., from the figures of the corresponding month of 1912.

Western Cities

City	Nov., 1913	Nov., 1912
Cedar Rapids	$497,000	$178,000
Dallas	876,615	318,250
Denver	155,129	318,010
Des Moines	108,990	136,915
Duluth	204,673	395,115
Kansas City	934,672	1,638,965
Lincoln	145,623	206,725
Los Angeles	1,200,158	2,597,723
Minneapolis	820,990	707,645
Oakland	414,226	987,294
Omaha	268,590	323,600
Portland	608,865	646,130
St. Joseph	132,515	92,122
St. Louis	1,073,643	1,079,423
Salt Lake City	171,800	99,350
San Antonio	102,800	261,813
San Francisco	1,142,986	1,912,932
Seattle	387,790	403,310
Sioux City	118,127	108,835
Spokane	78,610	130,570
Tacoma	63,520	159,610
Topeka	39,308	74,240
Wichita	212,350	42,300

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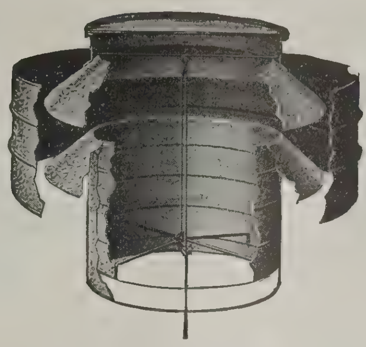
In proportion to its weight California redwood is the strongest conifer so far tested at the United States Forest Products Laboratory. This strength is due to its long wood fibers.



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No words we can add can speak more eloquently of the superior merits of the BURT VENTILATOR than this.

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Standard Oil Co.—65th order.
United States Government—55th order.
American Beet Sugar Co., Denver, Colo., 77 24-inch—eighteenth order.
Chicago Ry. Co., Chicago, Ill., 56 16-inch—fourth order.
Imperial Tobacco Co., Richmond, Va., 77 20-inch—eighth order.
Stecher Lithographic Co., Rochester, N. Y., 41 48-inch—third order.
Armstrong Cork Co., Beaver Falls, Pa., 29 24-inch and 9 30-inch—fifth order.
Canadian Locomotive Works, Montreal, Canada, 21 24-inch—sixth order.
Scoville Mfg. Co., Waterbury, Conn., 5 48-inch and 10 36-inch—fifth order.
Consolidated Gas Co., New York City, 2 36-inch and 3 20-inch—second order.
Canadian Pacific Railway, Montreal, 224 24-inch—13th order.
Armstrong Linoleum Co., Lancaster, Pa., 49 24-inch—third order.
Jno. A. Roebling's Sons Co., Trenton, N. J., 3 12-inch and 10 36-inch—fifth order.
Nicholson File Co., Paterson, N. J., 11 16-inch—fourth order.
Florida East Coast Ry., Miami, Fla., 49 24-inch—second order.
Wm. J. Oliver Mfg. Co., Knoxville, Tenn., 6 48-inch and 8 30-inch—fourth order.
Doe Run Lead Co., Flat River, Mo., 12 36-inch—third order.
Moctezuma Copper Co., Nacozari, Mex., 2 24-inch and 8 48-inch—second order.
The B. F. Goodrich Co., Akron, O., 25 24-inch and 8 36-inch—fourth order.
Vacuum Oil Co., Rochester, N. Y., 12 36-inch, 6 30-inch and 3 14-inch—ninth order.
Proctor & Gamble Co., Ivorydale, O., 7 30-inch and 4 24-inch—third order.
J. G. White & Co., New York City, 24 42-inch—fourth order
Stone & Webster Engineering Corp., Boston, Mass., 82 48-inch, 9 36-inch and 12 30-inch—37th order.
Terre Haute Traction & Light Co., Terre Haute, Ind., 16 48-inch—fourth order.
Edwards Mfg. Co., Augusta, Me., 54 30-inch—sixth order.

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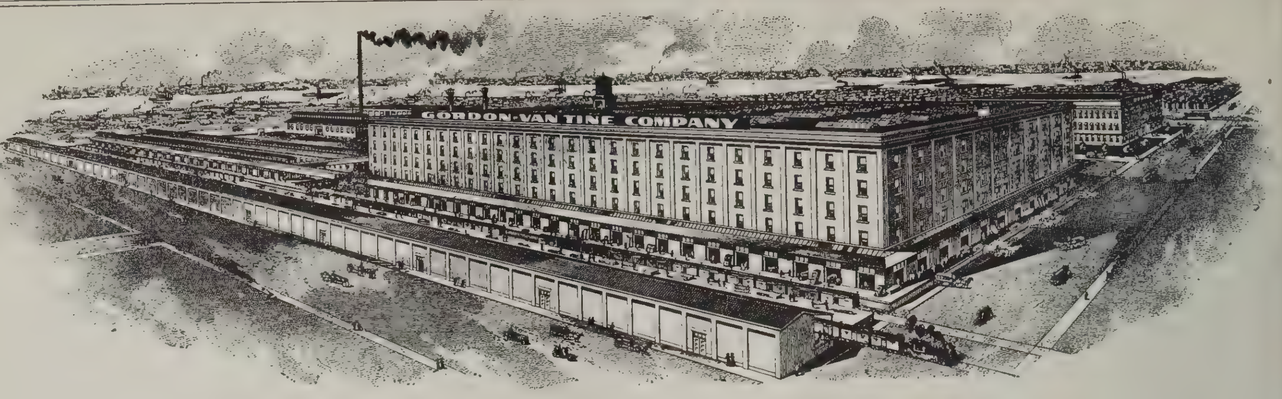

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Our business with Carpenters and Contractors throughout the Nation is growing with giant strides. They have come to realize the tremendous advantages offered by the Gordon-Van Tine Company's wonderful Millwork and Building Material Plant in Davenport, where everything used in a building, from shingle nails to the finest interior woodwork, can be secured in double-quick time at a fraction of retail prices.

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Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Larson Suction Ventilator

A ventilator which embodies some rather interesting features and which is designed for exhausting foul air, smoke or steam from public buildings and factories without mechanical means, is illustrated in Fig. 1 of the engravings. The natural draft passing through the suction tube forms a vacuum in the revolving ell, thus causing a draft and making a perfect discharge. The point is made that no matter in what direction the wind may blow the construction is such that the suction tube creates an up-draft. The exhaust end of the ventilator is perfectly free, presenting no friction and the exhaust is positive. The revolving ell moves freely upon hanger bearings that are set in cast iron seats and revolve in oil or grease, always presenting a perfectly free action without attention. The ventilators are made in all sizes to meet specifications and are also made to fit flat or peaked roofs without extra cost.

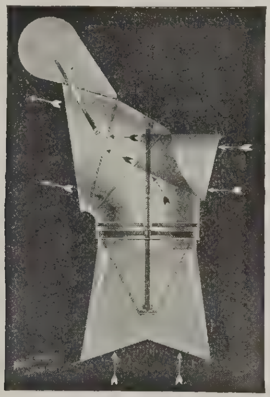

Fig. 1—The Larson Suction Ventilator

They are made of either ingot, toncan or galvanized iron and of 24 oz. copper as ordered. The standard sizes range from 10 to 40 in., or smaller sizes can be had without bases. The manufacturers are Larson Brothers, Johnsonburg, Pa., and the eastern sales agent is J. W. Johnson, 6 East 30th Street, New York City. An illustrated pamphlet has been issued relating to the ventilators in question and a copy of it will be sent to any reader of *The Building Age* desiring it.

"Bermico" Building Paper

The warmth of a house in winter and its coolness in summer are dependent in some measure at least on the manner in which the outer walls and roof are constructed. In the well built house the sheathing boards are covered with building paper or felt and this in turn by shingles or clapboards as the case may be. The paper may also be used between the floors for sound deadening purposes. Upon the quality of the fiber selected depends largely the wearing quality of a building paper and some interesting facts on this subject are contained in a recent trade communication of the Berlin Mills Co., Portland, Maine, relative to facts developed in the manufacture of the "Bermico" building paper, as made by this company. According to the results of the experiments conducted by the company for the production of a high grade building paper it is desirable to use pure, clean, coarse fiber, screened from high grade paper pulp. The fibers which are then separated are said to possess valuable insulating properties which is due to the homogenity of the material. In the manufacture of "Bermico" no filling or other material is used, and experiments show that the use of this coarse, clean, pure fiber produces a sheathing paper which combines strength with a certain amount of resistance to dampness and moisture. This paper is manufactured in two colors, red and green, and in two weights, of 80 and 50 rolls to the ton, respectively. It is rosin coated, comes in 36 and 40-in. rolls, and is warranted to contain 500 sq. ft. per roll. The manufacturers of this product offer to send a sample roll of Bermico building paper to any responsible architect or builder on application.

The Laughlin Cistern Form

In those communities where a city water supply is not available rain water for washing purposes is frequently stored in cisterns which are supplied through pipes connecting with leaders from the roofs of buildings. In order that this water may be stored in the best possible manner the cistern is often constructed of concrete, which, as is well known, becomes harder and better the older it grows. In order to build such cisterns "forms" are necessary and these must be strong to withstand the rough usage of inexperienced workmen in addition to the usual wear and tear. A "form" which is well adapted for this kind of work is the Laughlin Collapsible and Adjustable Cistern Form, a section through one of which is shown in Fig. 2. These "forms" are adjustable to any size or shape of dug holes from 25 to 100 barrels capacity, and with two "forms" it is claimed a cistern can be built having a capacity of 500 barrels. The "forms" are made of cold rolled steel and consist of 18 reinforced staves, 18 x 72 in., each one held to the next stave by four steel locks in a vise-like grip; the arch consisting of steel plates; a mold for the collar, and a collapsible support. It is stated that the collapsed form can easily be removed through the regular opening and is readily transported. In constructing a cistern the "form" is put in one day, the concrete is allowed to set and the "form" may be taken out the next day. In this manner it is stated the contractor can put in three cisterns every week with one "form," and no high-priced or experienced help is necessary. The Laughlin "forms,"

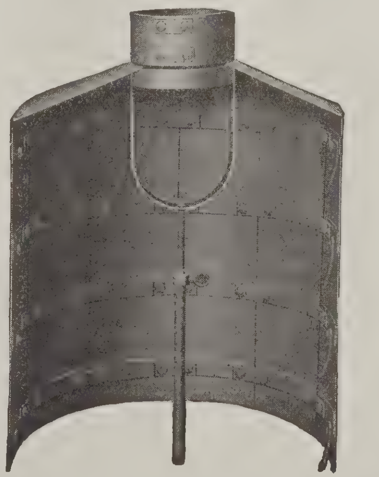

Fig. 2—Sectional View of the Laughlin Cistern "Form"

which are made by the Laughlin Mfg. Company, Dayton, Ohio, provide a simple method of making cisterns for any one who knows how to handle concrete.

Richards-Wilcox "Niagara" Grindstone

The Richards-Wilcox Mfg. Company, Aurora, Ill., has placed a new grindstone on the market, called the "Niagara," a view of which is shown in Fig 3. The "Niagara" grindstone has a frame of thoroughly seasoned hardwood securely braced and strongly made.

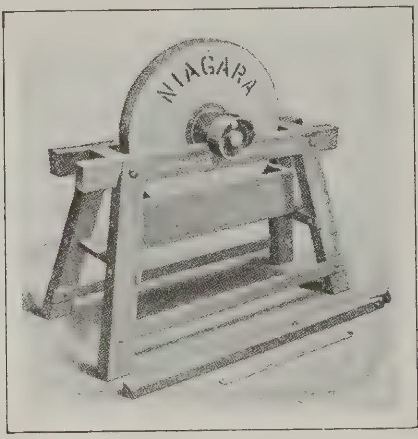

Fig. 3—General View of the "Niagara" grindstone

The stones proper are Berea grit for farm or factory use, size 24 in. in diameter by 3 in. think. These are mounted on perfect ball-bearing journals which are dust and grit proof. The stones and frames can be shipped separately. The steel shaft is detachable. The pulley is 6 in. in diameter with a 3-in. face. A hand crank is furnished with each machine. A foot pedal is extra and only furnished when specified.

The approximate weight of the stone with fixtures, crated, is 140 lb. The weight of the frame is 45 lb. Weight complete, 185 lb. Shipped knocked down.

Burt Ventilators for Moving Picture Theatres

One of the rapidly developing fields for the increased sale of fan ventilators is the moving picture theatre, the ventilation of which is an important factor, viewed from the standpoint of health and comfort of the audience within. Recently the Burt Mfg. Company, 312 Main Street, Akron, Ohio, installed in the Bank Theatre in that city two 30-in. fan ventilators of the type illustrated and described in these columns in November, 1911. The theatre in question occupies much finer quarters than the average moving picture show room, as the building was previously used by a bank. The room is about 30 x 90 ft., with a very high art-glass dome ceiling. The theatre will seat about 400.

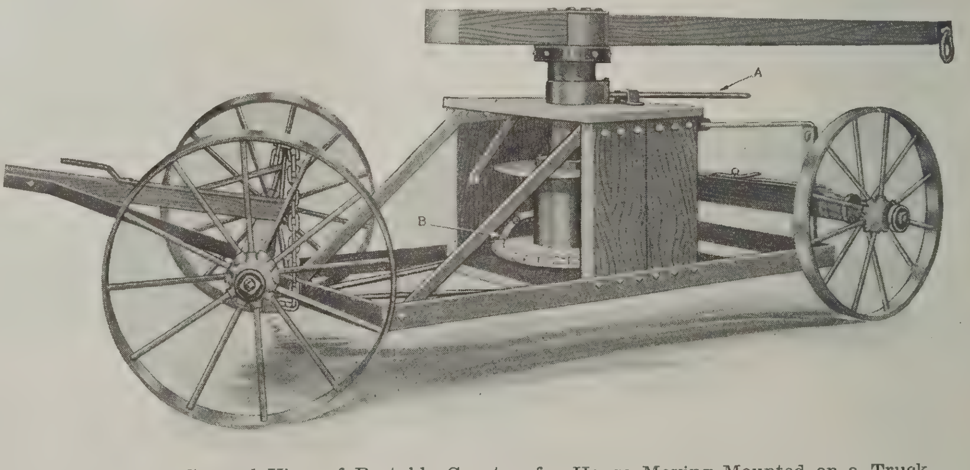

Fig. 4—General View of Portable Capstan for House Moving Mounted on a Truck

When the room was rearranged for moving picture purposes a 30-in. ventilator was placed at each end in the dome. Each ventilator is direct connected to a ¼-horse-power constant speed motor that drives the fan at a speed of 425 revolutions per minute. The fan, which is located in the lower part of the exhaust pipe, is intended to create a strong current of air through the ventilator and is said to increase the efficiency of the ventilator ten times. The use of this ventilator in the Akron theatre is said to have proved very successful, the air in the room being kept fresh when the theatre is crowded. If desired fresh air can be introduced by reversing the motion of the fan, so that one or more ventilators may be used to bring air into a building, while the others are used for exhaust purposes.

Value of Copper in Tin Roofing Plates

Recent tests have established the fact that scientifically manufactured steel when alloyed with a certain percentage of copper possesses remarkable durability and will resist corrosion and the action of the elements to a greater degree than ordinary steel without copper. The tests above referred to, which were conducted by the American Sheet & Tin Plate Co., Pittsburgh, Pa., further indicate that these products are more largely dependent for any increased durability on their contents of copper than on their purity. The presence of a certain amount of copper renders steel softer and more ductile, according to these tests, in which the so-called "Copper Bearing Steel" has been subjected to severe drawing and forming operations in competition with ordinary steel manufactured under the same conditions. The tests prove that Copper Bearing Sheets and Copper Bearing Terne Plates are well adapted to the manufacture of roofing, siding, culverts, tanks, car roofs and all exposed sheet metal work where durability and resistance to deteriorating influences of weather and soil are highly important factors. Detailed data, giving the results of both service and chemical tests of copper bearing steel, will be supplied by the American Sheet & Tin Plate Co. to any interested consumer.

Portable Capstan for House Moving

The moving of houses from one location to another is one phase of work which the builder is now and then called upon to do but is often a business subject to many annoyances and delays. Losses of time are unavoidable and the conditions under which work may be performed are sometimes productive of very serious problems. Any appliance which will reduce the time and labor necessary to move the heavy capstan is worth investigating and such an appliance is found in the portable capstan for house moving illustrated in Fig. 4 of the accompanying cuts and manufactured by the House Movers' Supply Co., Cedar Rapids, Iowa. It is designed to develop 45 h.p. with two horses. The front truck may be used as a stake puller, the tongue acting as the lever and the chain being wound about the stake. The spool is all steel and fitted with a hand brake by which a tension may be placed on the cable in running back with loose line. The lower flange of the spool is fitted with a ratchet safety lock, which holds the pulling load, and therefore removes strain upon the horses. The spool has a capacity of 800 ft. of ⅝-in. cable. The frame is made of steel angles and is hung in front by a chain and raised and lowered by raising the tongue and hooking the chain in the angle plate at the base of the tongue. The frame is attached to the rear axle by ratchet bars which easily raise and

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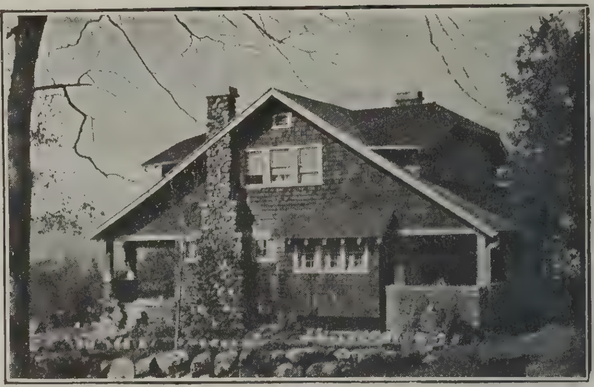

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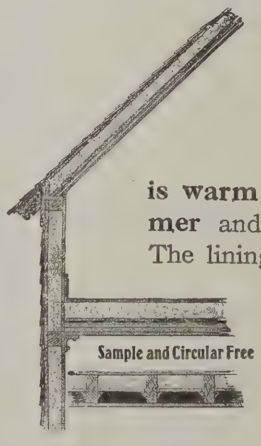

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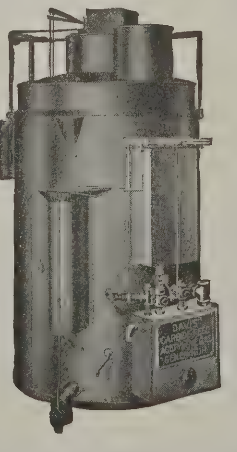

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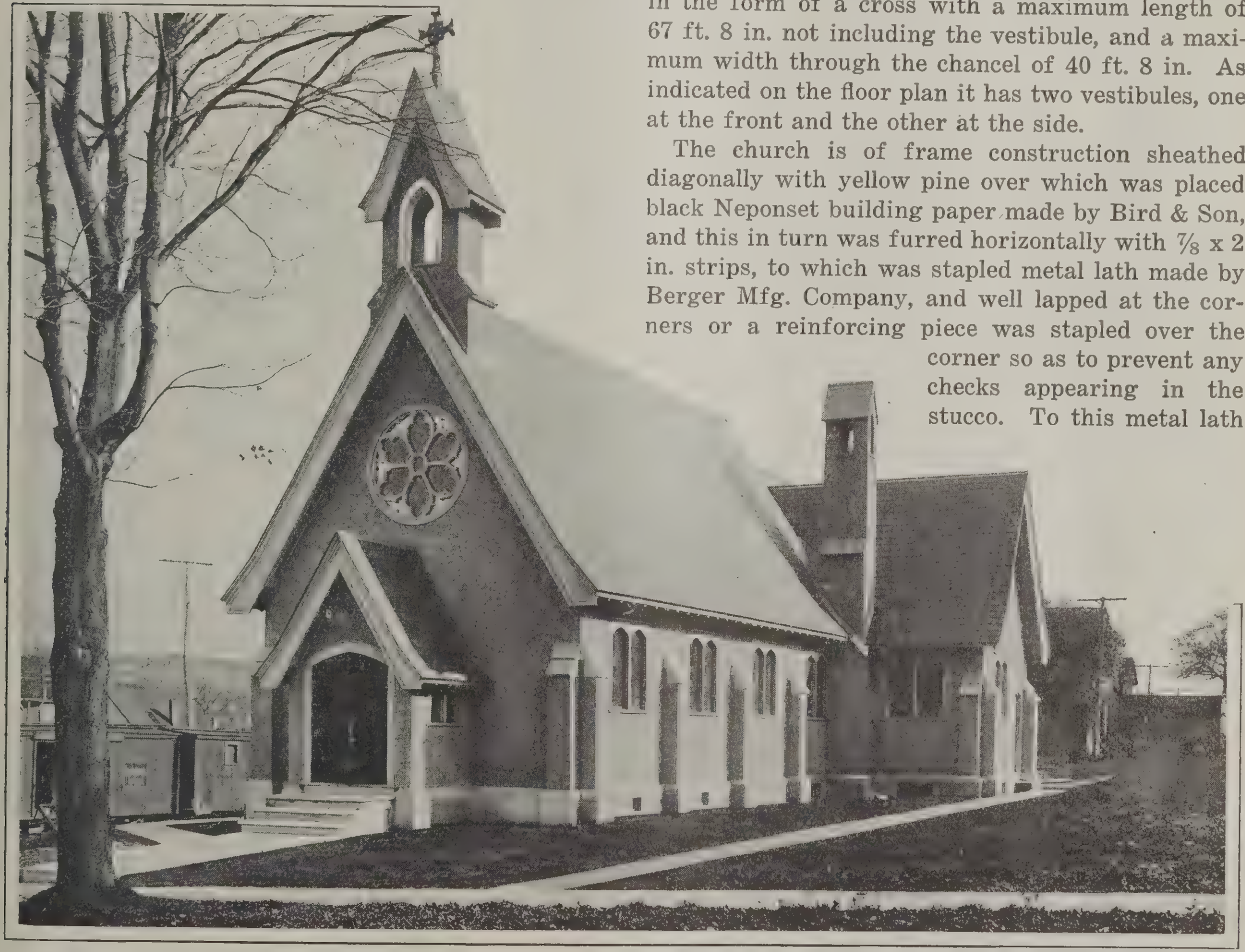
THE BUILDING AGE

NEW YORK, FEBRUARY, 1914

An Episcopal Chapel of Stucco Finish

An Attractive Design Executed at Marathon, N. Y. —Interesting Details of Construction and Finish

We present in the accompanying illustrations design of a small church building well adapted to meet the requirements of suburban districts, small towns, villages, etc., and embodying in its construction and arrangement features which cannot fail to appeal to the architect and the builder. The half tone engravings afford an excellent idea of the appearance of the finished structure and also of the interior fittings, while the plans and longitudinal section indicate the arrangement and some of the more important constructive features.



Photographic View of Episcopal Chapel Lately Erected at Marathon, N. Y.—J. M. Burnham, Builder, Cortland, N. Y.

As it is an Episcopal Church the ground plan is in the form of a cross with a maximum length of 67 ft. 8 in. not including the vestibule, and a maximum width through the chancel of 40 ft. 8 in. As indicated on the floor plan it has two vestibules, one at the front and the other at the side.

The church is of frame construction sheathed diagonally with yellow pine over which was placed black Neponset building paper made by Bird & Son, and this in turn was furred horizontally with ⅞ x 2 in. strips, to which was stapled metal lath made by Berger Mfg. Company, and well lapped at the corners or a reinforcing piece was stapled over the corner so as to prevent any checks appearing in the stucco. To this metal lath was applied two coats of cement mortar, the first coat consisting of cement, sand, hydrated lime and hair and the second consisting of the same with the addition of a waterproofing compound. After the last coat was applied and made fairly level and smooth felspar rock in sizes ranging from 1/8 to 3/8 in. were applied and pressed in—not floated—with a wooden float.

The foundation walls, water table, buttress caps and chimney roof are of plain cement with a finish of white cement, sand floated. The roof is covered with Vermont slate, green in color.

All the exterior woodwork of the building is of cypress. The floors are double, the sub-floor being laid diagonally while the finish floor is of rift sawed yellow pine planed, sanded and scraped and then finished natural under shellac. The ceiling panels are of Southern pine finished natural. All other woodwork is of selected chestnut finished a dark oak in color.

The walls are plastered two coats, sand floated and finished in cream color Melotone. The seats are of white oak and finished to match the chestnut.

The ridge timbers, purlins, principal rafters and pilasters are covered with 1¼-in. chestnut veneer, closely braded on and not glued. This veneer was put on after the trusses were in place. The large brackets in all the angles of the trusses have a soft pine core. The side veneers are of 7/8-in. chestnut and the face veneer 3/16-in. braded and glued on after the brackets were lag screwed in place.

While these brackets appear to give strength as well as beauty to the angles they are not required to do a great amount of work. Housed into the brackets and extending across the two angles of the trusses and pilaster are 1 x 3 in. angle irons bolted to members by means of 5/8-in. bolts. There is also a ½ x 2 in. tension truss across the upper angle of iron bolted with the same size bolts in order to prevent any tendency to cripple at this point.

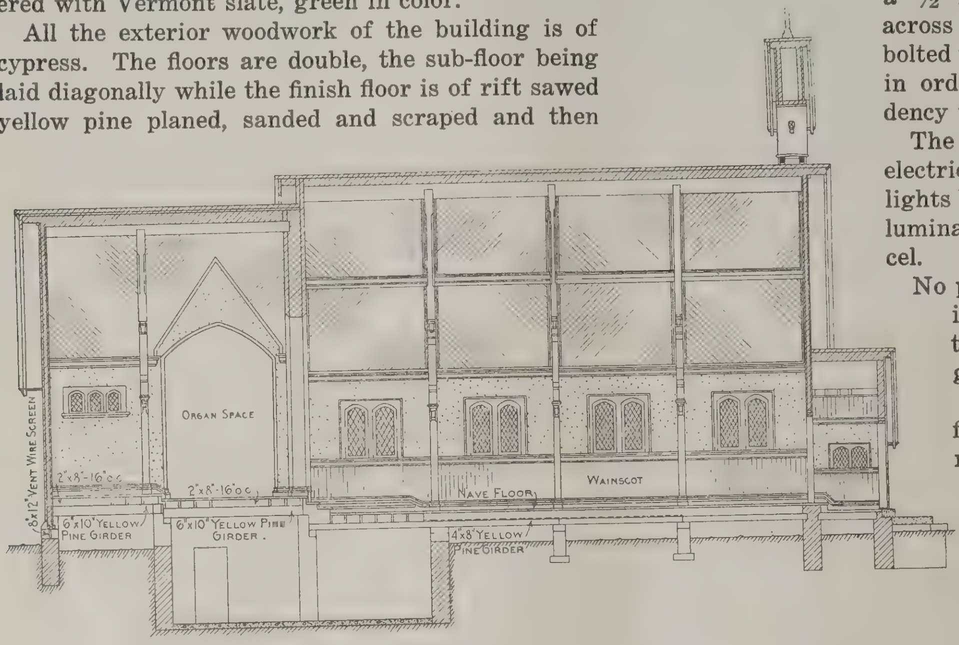
The church is lighted by electricity, a semicircle of lights behind the large arch illuminating the altar and chancel.

No permanent windows are installed at the present time—only temporarily glazed.

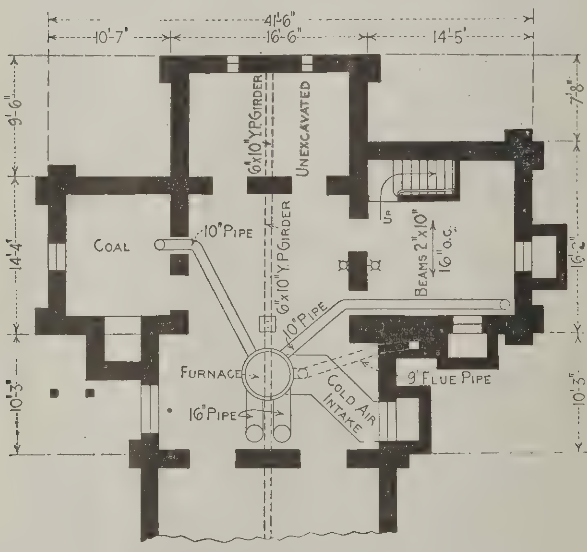
An inspection of the floor plan will show the relative position of the nave, chancel, organ, dressing room, lavatory, closets, etc.

The church is heated by a Kelsey Warm Air Generator made by the Kelsey Heating Company, of Syracuse, N. Y.

In constructing the church but very few changes were made from the original design. One, however, which made some considerable difference in the appearance was in connection with the irons

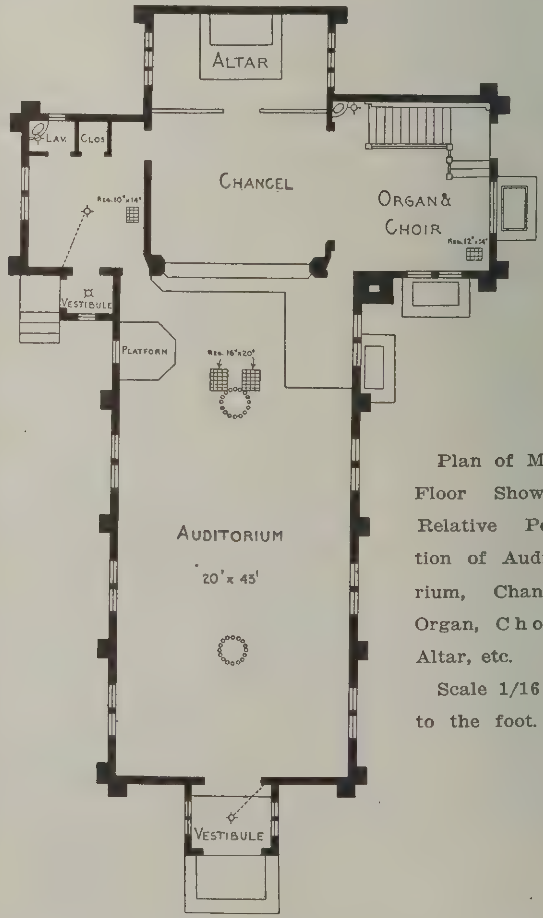


Vertical Longitudinal Section Through the Chapel—Scale 1/16 In. to the Foot



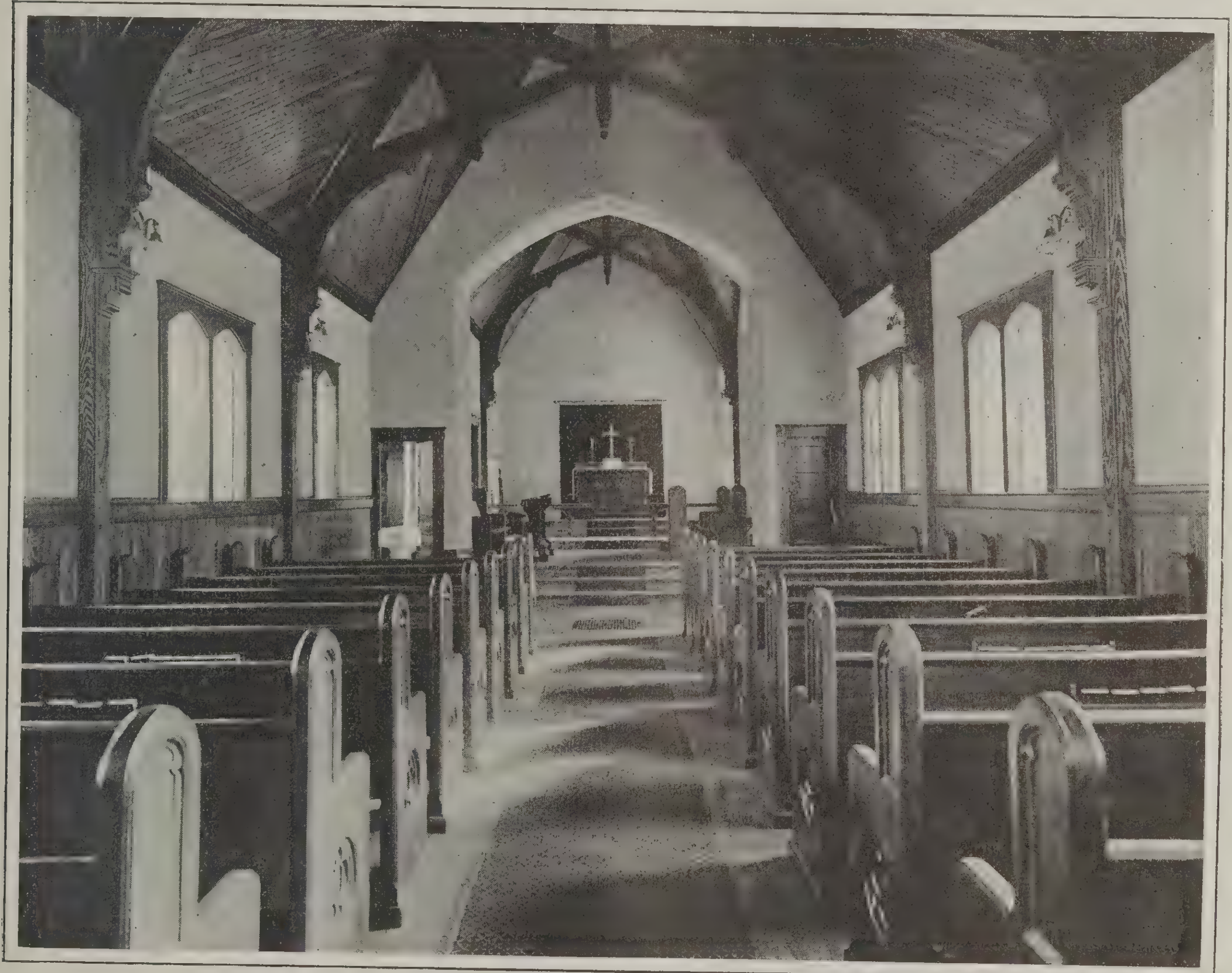
Plan of the Service Portion of the Basement—Scale 1/16 In. to the Foot

An Episcopal Chapel of Stucco Finish



Plan of Main Floor Showing Relative Position of Auditorium, Chancel, Organ, Choir, Altar, etc. Scale 1/16 in. to the foot.

above referred to as being "housed into the brackets." They were originally intended to be bolted to the side of the truss, but it was felt that the change referred to greatly improved the appearance and at the same time added some strength at that point. Probably the most important change came about in the following manner. The original specifications called for yellow pine trusses, pilasters and exposed roof timbers. When they were secured they were faulty by reason of some stain, a few knots, also gum spots, and season checks, with more likely to appear, but no better ones were to be had. The committee on church building was not satisfied that this material would give as good a finish as they had desired and they therefore adopted the suggestion of the builder that the ridge timbers, purlins, principal rafters and pilasters be veneered with chestnut, coloring the latter in imitation of a dark oak and making a dark border around the natural roof panels of Southern pine. This veneer work, coupled with the matched grain, has made the interior woodwork of this little church very attractive and distinctive.



An Episcopal Chapel of Stucco Fnish—View Looking Toward the Chancel and Altar

Beauty in finished woodwork, as is well known, is largely a matter of proper selection and matching up, and especially so where the grain in the woods is very pronounced. Nature made some very pretty grains in chestnut—some coarse, some fine, some wavy and figured—a pretty burl with waved lines radiating from it. The builder states that a coarse grain was matched with a coarse grain, a fine one with a fine one, a burl with a burl and a figure with a figure, so that the grain as in the tree appears to run continuous in the finish. Some of the large brackets are so closely matched that they appear to have grown in the angles.

The casings, jambs and heads of doors and windows are matched and paired for grain and color, as also are the doors. While requiring but a comparatively little time to accomplish this, yet the harmony, beauty and character of the work resulting was ample compensation for the time and trouble expended.

The small Episcopal chapel here shown was erected at Marathon, N. Y., in the fall, winter and spring of 1912 and 1913 by J. M. Burnham, 59 West Main street, Cortland, N. Y., who worked under the supervision of a building committee, there being no contract work on the church, except in slating the roof as all was done by day's work.

The plans were drawn by Architects Upjohn & Conable, 456 Fourth avenue, New York City.

As items of cost and bill of materials are always of interest in connection with work of this character, we present in what follows the leading items and figures as furnished by Mr. Burnham:

Materials

EXCAVATING, MASONRY, PLASTER AND STUCCO.

100 yards excavating, at 35 cents	$35.00
200 perch of stone laid in wall, at $2.25	450.00
Cement finish on walls	75.00
66 yards cement cellar floor, at 50 cents	33.00
Chimney complete	90.00
Drain laying	30.00
420 sq. ft. cement walks, at 12 cents per ft	50.40
Cement steps and platform	50.00
330 yards stucco, at $1.25	412.50
450 yards plaster, at 30 cents	135.00

HEMOCK LUMBER			
17 sills 2 x 6—12....	204 ft.		
26 sills 2 x 6—14....	364 ft.		
4 sills 2 x 6—16....	64 ft.		
41 collar joists and headers 2x6—14...	574 ft.		
76 rafters 2 x 6—20...	......	1520 ft., at 3 cents	$45.60
42 rafters 2 x 6—16...	672 ft.		
20 rafters 2 x 6—12...	240 ft.		
24 rafters 2 x 6—18...	432 ft.		
24 joists 2 x 8—16...	512 ft.		
12 joists 2 x 8—14...	228 ft.		
82 joists 2 x 8—12...	1,312 ft.		
4 joists 2 x 10—16...	105 ft.		
12 joists 2 x 10—12...	240 ft.		
270 studding 2 x 4—14.	2,520 ft.		
320 studding 2 x 4—12.	2,560 ft.		
28 studding 2 x 2—12.	112 ft.		
Total	10,139 ft.,	at 2½ cents......	253.48
2,000 ft. staging, at $22 per M......................			44.00
350 ft. water table "forms," at 3 cents............			10.50
5,000 lineal ft. ⅞ x 2 furring, at 1 cent...........			50.00
2,700 matched sub-floor, at $27...................			72.90
1,200 lineal ft. grounds, at ½ cent................			6.00
YELLOW PINE LUMBER			
11,000 ft. yellow pine roofers, at $26..............			286.00
700 ft. soft pine for forms, patterns and cores, at $50			35.00
6 principal rafters 6 x 8—20 ft..	480		
2 principal rafters 6 x 8—14 ft..	112		
6 cross faces 6 x 8—15........	360		
2 cross faces 6 x 8—10.........	80		
8 pilasters 6 x 8—14...........	448		
8 purlins 6 x 8—12...........	384		
1 girder 6 x 10—10...........	50		
2 girders 6 x 10—12...........	120		
2 girders 6 x 8—16............	128		
1 ridge 3 x 12—16............	48		
1 ridge 3 x 12—14............	42		
5 ridge 3 x 12—12............	180		
4 brackets 5 x 6—14...........	140		
	2,572	at 3½ cents..	$90.02
CYPRESS CORNICE			
36 soft pine rafter stubbs, 2 x6—12, 432 ft., at 4 cents			17.28
1,100 ft. (1⅛") soft pine matched plancier, at 4½ cents			49.50
500 ft. (1") soft pine matched plancier, at 4 cents..			20.00
CYPRESS FRIEZE			
16 pcs. ⅞ x 10—12 ft.			
20 pcs. ⅞ x 5¼—12 ft.			
4 pcs. ⅞ x 8—12 ft.			
450 ft. of quarter round.			
19 pcs. 1⅛ x 5½—12 ft. fascia.			
CYPRESS CORNICE			
7 pcs. 1⅛ x 16—12			
4 pcs. 1⅛ x 16—10			
3 pcs. 1⅛ x 16—14			
2 pcs. 1⅛ x 14—16			
1 pc. 1⅛ x 14—14			
2 pcs. 1⅛ x 14—12			
CYPRESS BARGE BOARDS			
6 pcs. 1⅛ x 12—10			
4 pcs. 1⅛ x 8—12			
3 pcs. 1⅛ x 6—12			
5 pcs. 1⅛ x 7—14			
CYPRESS FACING			
20 pcs. ⅞ x 2—14			
6 pcs. 1⅛ x 2—12			
CYPRESS MOULDINGS			
200 lineal ft. 4" crown moulding.			
100 lineal ft. 3" sprung cove.			
200 lineal ft. ⅞ x 5" board cove.			
200 lineal ft. ⅞ x 3" board cove.			
100 lineal ft. ⅞ x 2" board cove.			
90 lineal ft. ⅞ x 2⅜" board cove.			
Total			$117.50
Building paper			50.60
Slating roof, 40 squares, at $9....................			360.00
Metal work, including eave troughs, spouts, flashings and conductors			85.00
Exterior painting			50.00
Door and window frames.........................			156.50
INTERIOR FINISH			
2,200 ft. rift sawed yellow pine floor, at 4½ cents..			$99.00
3,200 ft. rift ½-in. yellow pine ceiling, at $27......			86.40
3,000 ft. flat chestnut, at 6 cents..................			180.00
Chestnut veneers			40.00
Brackets			75.00
Moldings			27.00
Cornice			40.00
500 ft. 1-in. yellow pine finish lumber, at 6 cents...			30.00
Doors			115.00
Temporary glass colonial.......................			30.00
Cellar, sash			9.00
Stairs to cellar, complete......................			35.00
Varnishing, filling and water colors.............			255.00
Electric wiring and fixtures.....................			135.00
Seats			450.00
Carpenter work, machine work, veneering and form setting			1,826.82
Heating			200.00
Plumbing			80.00
Nails and finish hardware.......................			85.00
Angle irons and braces..........................			35.00
Freight and cartage.............................			100.00
Total			$7,094.00
5 per cent. for incidentals.......................			354.70
Grand total.....................................			$7,448.70

Carpentry work in the above is figured on a basis of 40 cents per hour; the mason work at 75 cents; the painting at 40 cents and the electric lighting at 50 cents per hour.

The little chapel here shown was according to Mr. Burnham "built for to-morrow as well as for to-day," and has strength, rigidity and stability.

Our Colored Supplement for March

The design which will constitute the basis of our colored supplemental plate for March is of a decidedly striking character and well adapted for a suburban or country home. The first story is of field boulders laid up in rustic pattern and giving a rather impressive effect. The second story with gables is of cement finish, while the various broken surfaces of the roof have that thatched effect which is becoming more or less popular just at the present time. The general treatment is one which instantly commands attention and we are sure it will be greatly appreciated by our many readers.

Contractor's Duty to Pedestrians

Speaking of the rights of pedestrians concerning a temporary covered bridge built by a contractor, for the demolition of a building, over sidewalks so that the work could be done without interrupting traffic, the Appellate Division of the New York Supreme Court, in the recent case of Nessler vs. New York House Wrecking Company, 141 New York Supplement 458, said: "The traveler cannot expect that the temporary passageway is either as convenient or as safe as that afforded by a sidewalk under ordinary conditions; but the extraordinary circumstances must be taken into consideration, in our view of the relative rights and obligations of the traveler and of the defendant."

In the case above mentioned, plaintiff, a pedestrian, sued for injury sustained while attempting to pass from a roadway to the sidewalk, by stumbling over the sill forming a part of the temporary bridge. In reversing a judgment in plaintiff's favor, the Appellate Division decided that, under the particular circumstances established by the evidence, it could not be found that the contractor was negligent in not failing to prevent access to the sidewalk from the roadway by constructing a railing, or in not cutting down the height of the sill.

Preventing Windows from Sweating

An ingenious device for preventing the steaming or sweating of windows in cold weather consists of a fishtail burner through the flame of which a blast of air is directed against the window. The air is dried in passing through the flame and in spreading over the surface of the window completely prevents any deposit of moisture thereon. The fan is acted upon by a small electric motor. In a trial of the apparatus, says the *Electric Review and Western Electrician*, a window was completely covered with steam from a kettle. On application of the blast from the apparatus the window was cleared in 30 seconds and no new deposit was produced so long as the apparatus was at work.

Benefits of Organization by Builders

An Instructive Talk on the Above Subject by the Secretary of The Builders Exchange of Cleveland, Ohio

ONE of the very interesting talks given at the banquet of The Builders Exchange of Pittsburgh held at the Fort Pitt Hotel on Thursday evening, December 18, was that of Edward A. Roberts, secretary of the Cleveland Builders Exchange, who discussed the benefits of organization. We take pleasure in presenting copious extracts from his remarks herewith:

Our own city may be taken as an example to illustrate the statement that the present is essentially an era of organization. Thirty years ago organizations were comparatively few. If a man belonged to a lodge and a church he thought he was about fixed. Twenty years ago there still seemed to be need of few associations such as we have today, but within the last ten or fifteen years all lines of business have come to realize the necessity of standing together for mutual protection and mutual benefit until now you can scarcely name a single profession, trade or calling that is not represented by an organization.

Needs of the Building Business

There is certainly none in need of the benefits that may be derived from organization so badly as the building business. This statement is equally true in all large cities of the country. While other trades may unite to eliminate competition and make uniform regulations, the builder still indulges in the wildest kind of speculation, there is still the same wide variation of bids and still the minus sign on the ledger too often when the job is finally completed. Mark Twain once made the wise remark that there were two times in a man's life when he should not speculate, one of these was when he could not afford it and the other was when he could. That is about the situation in reference to building work at present.

To some extent the elements which operate against success in the work of the average builder are outside ones, but to begin right each contractor should perfect an efficient organization on his own account before he blames others or general conditions for his failure to make money.

How a Builders' Exchange May Help

Once the individual business is properly organized we come to consider the benefits of associating a number of these units together for mutual help and profit. In discussing this phase of the question we should recognize that the builder in the daily conduct of his business comes into contact with five distinct elements—the owner, the architect, his fellow builders, the material dealer and his workmen. How then may an organization such as a Builders Exchange assist him in these five important relationships?

By striving for just and equitable principles of dealing with the public as well as a high standard of honesty and efficiency on the part of members, an exchange may come to be recognized by the public as an organization worthy of special consideration. Through its interest in civic affairs, especially those connected with public improvements, the exchange is accorded a place as a vital factor in the city's progress. Membership in such an organization, to some extent, is considered a mark of responsibility and each individual member benefits from his association in so far as the opinion of the public is concerned.

Joint Conferences

In so far as architects recognize their mutual interest with the contractors and join with them in matters for the common good an Exchange is helpful to this element in the community. Several cities have joint conferences with the architects on better plans and specifications, standard requirements, better building regulations, etc. Cleveland has had such a committee for two years and during the last year this committee held thirty-five meetings. Joint luncheons and dinners also helped to break down the feeling of antagonism that formerly existed between these two branches and now instead of hostility is a spirit of friendliness and sociability.

As for your fellow builders, it probably must be admitted that competition cannot be eliminated, but competitors can deal with each other like men rather than like beasts over a bone. The new idea in business is not to fight your competitor but rather to get as close to him as possible, exchange ideas with him and find profit thereby. Andrew Carnegie once said in a meeting before our Exchange that we can only really hate the man we do not know. Association begets friendship and friendship begets esteem. Life is too short to overlook the human side in business. By engaging in movements for the common good, men get better acquainted with each other and a better feeling is sure to result.

The Dealer in Builders' Materials

Touching the material dealer there is a mutual basis of benefit in the exchange for the contractor and the dealer. The dealers bring trained business heads to the organization and are of great benefit in the management of its affairs as well as of value in time of trouble. In return for what they bring to the organization they find benefit in the opportunities afforded them of meeting the men with whom they do business on a common footing. In many of the exchanges exhibition features are now being conducted which make the rooms attractive and more than loafing places.

In their relationship with their workmen, contractors all over the country are in need of compact organization. It is difficult to keep the contracting element organized, especially in times of comparative peace. It was early discovered in Cleveland that an exchange with its varied membership is not well adapted to compete with labor conditions and we organized what is known as the executive board of the Building Trades Employers. This organization is composed of delegates and alternates from each of the individual trade associations and all matters relating to labor are handled by this board which has the backing and support of the Exchange and the use of all of its facilities.

In addition to this board we also have the Contractors' Protective Association composed of contractors who do concrete construction and who have adopted a plan similar to that followed in Chicago of maintaining a permanent organization.

◆

Convention of Brick Manufacturers

Official announcement has been made that the twenty-eighth convention of the National Brick Manufacturers' Association will be held in New Orleans, La., March 2 to 7, the week immediately following the Mardi Gras Carnival. This is the sixth time in the history of the association that its annual sessions will be held in a southern city and the selection of New Orleans was the result of a mail vote conducted by the executive committee. We understand that more than three times as many votes were cast for the Crescent City than for any other one place seeking the distinction.

It is hoped to make the coming meeting one of the largest in the history of the organization and the fact that the convention follows the last week of the Mardi Gras will without doubt take many to New Orleans who would not have attended a convention in another city as they will be able to attend these festivities by making the trip a few days earlier than would otherwise have been the case. The Grunewald Hotel has been chosen for headquarters during the convention, as it affords ample assembly halls, a splendid banquet room and other needed accessories. Its lobby and mezzanine floor are spacious and beautiful, making it a charming haven of rest after a day of sightseeing.

◆

Wood Using Industries in New York

The report on the wood-using industries of New York, which has just been issued by the New York State College of Forestry at Syracuse, shows that the consumption of forest products of the Empire State amount to more than 1,750,000,000 board feet per year. This is considerably more than the amount used by any other state in the Union. The report shows that the woodworking establishments of New York turn out everything from big structural timbers down to the finest dowels, toothpicks and pegs. Surprising quantities of wood are being used in such unusual articles as wood fiber plaster, wooden shoes, toys, spools, all sorts of handles, etc. One of the attractive things brought out by the report is that slabs and waste formerly burned up or left to rot in the woods are being used in many effective ways such as the making of small articles, toys, etc., as well as acid and other chemical products.

The report shows that in 1850 New York led all the other states in the production of lumber, but to-day it has fallen until the state is now twenty-third in the list of timber producing states.

The field work in preparation for the report showed that immense amounts of Douglas fir, western cedar and even California redwood are being sent across the country for use in our various wood using industries. Enormous quantities of yellow pine and southern cypress are used also in New York state in building operations and other industries. So rapidly have the splendid virgin white pine forests disappeared from New York that today we send to Michigan, Minnesota and Canada for our finer grades of white pine and other woods. Such substitutes as Southern hard pine, cypress and western pine are rapidly taking the place in our market of high-class lumber produced earlier in New York state.

◆

Officers of Cement Manufacturers' Association

At the annual meeting of the Association of American Portland Cement Manufacturers held in New York City in December, officers were elected for the ensuing year as follows:

President....John B. Lober of the Vulcanite Portland Cement Company
Vice-Pres....R. S. Sinclair of the Alsen's American Portland Cement Works
Treasurer....L. Conn of the Giant Portland Cement Company

Very gratifying and practical results in the enlarged use of cement on the farm have been achieved through the able efforts of Percy H. Wilson, the energetic secretary of the Association, and L. R. Ferguson, the assistant secretary.

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Death of John Williams

John Williams, president of the John Williams Corporation, died at his home in Bronxville, N. Y., January 5th, aged 72 years. He was born in Ireland, came to New York when a boy and began his business career in the employ of Tiffany & Company, where he first achieved fame for his artistic designs in metal. In 1875 he engaged in business for himself and was the pioneer in this country in artistic metal work, executing many important designs in bronze, brass and wrought iron. We have in these columns at intervals referred to some of the beautiful work designed by him and prominent among that for which he was responsible are the Vanderbilt memorial doors of St. Bartholomew's Church; the doors of the H. H. Rogers Memorial Church at Fairhaven, Mass.; all the metal work in the Boston Public Library, including the doors which were modeled by D. C. French, the sculptor; the entrance doors of the Congressional Library in Washington and various statues in and about New York City.

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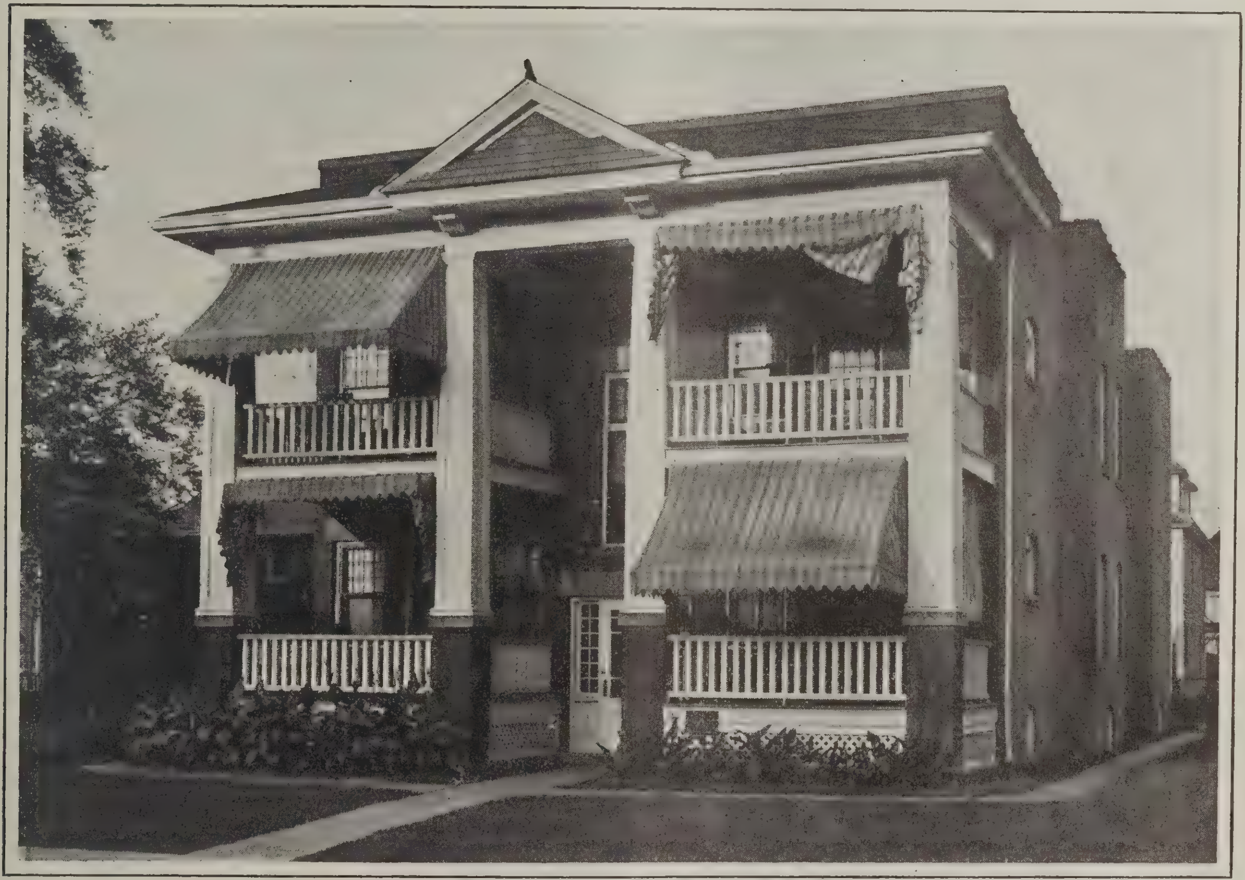
The most unique building in North Carolina from an architectural standpoint is said to be at Kinston. It is a large factory building which has more angles than any other structure in the state.

A Four-Family Apartment House

A Building in Which the Heat Is Supplied to Each Suite of Rooms by a Separate Furnace

THE apartment house in the small town has no such established footing as it enjoys in the large cities, where property values are high, population dense, and where the isolated dwelling has largely been crowded out. There is no question that there are many advantages in apartment house living, but there are some disadvantages, and these assume greater proportions as the size of the town under consideration decreases, and the proximity to rural conditions increases. Probably the most important objections registered by the small town dweller against the apartment house are its lack of fresh air facilities and breathing spaces, and in many instances its single heating plant. These objections have been met in the apartment house here described, the building being removed from the street a sufficient distance to avoid the noise and dirt incident to traffic; each apartment provided with a roomy front porch, and the isolated heating problem is solved by the installation of an independent hot-air furnace unit for each apartment. This house is located in Cleveland and is heated by natural gas. There is, therefore, in the basement no provision for the storage of coal.

The foundation footings are of brick extending to a point 4 in. from either side of the cellar walls and 7½ in. in depth. Upon these are laid two additional footing courses, each 5 in. in thickness, with headers and stretchers. The next course is set in 2 in. and upon this rests the wall proper, which is set in an additional 2 in. All footings are laid in cement mortar composed of one part Portland cement and four parts sand. From the footings to the grade the exterior basement walls are laid up with Dennison interlocking hollow brick, and the same material is used for 8 in. of the inside of the basement wall from grade to first floor joists. The exterior portion of this section of the wall is laid with common brick. The exterior of the basement walls is plastered with a coating ½ in. thick of cement mortar from the footings to the grade line, mixed in the proportion of one part Portland cement and four parts sand. The front of the building and the piers for the columns are composed of red pressed brick, laid up in Flemish bond with black mortar. The other exterior walls are laid with common brick.

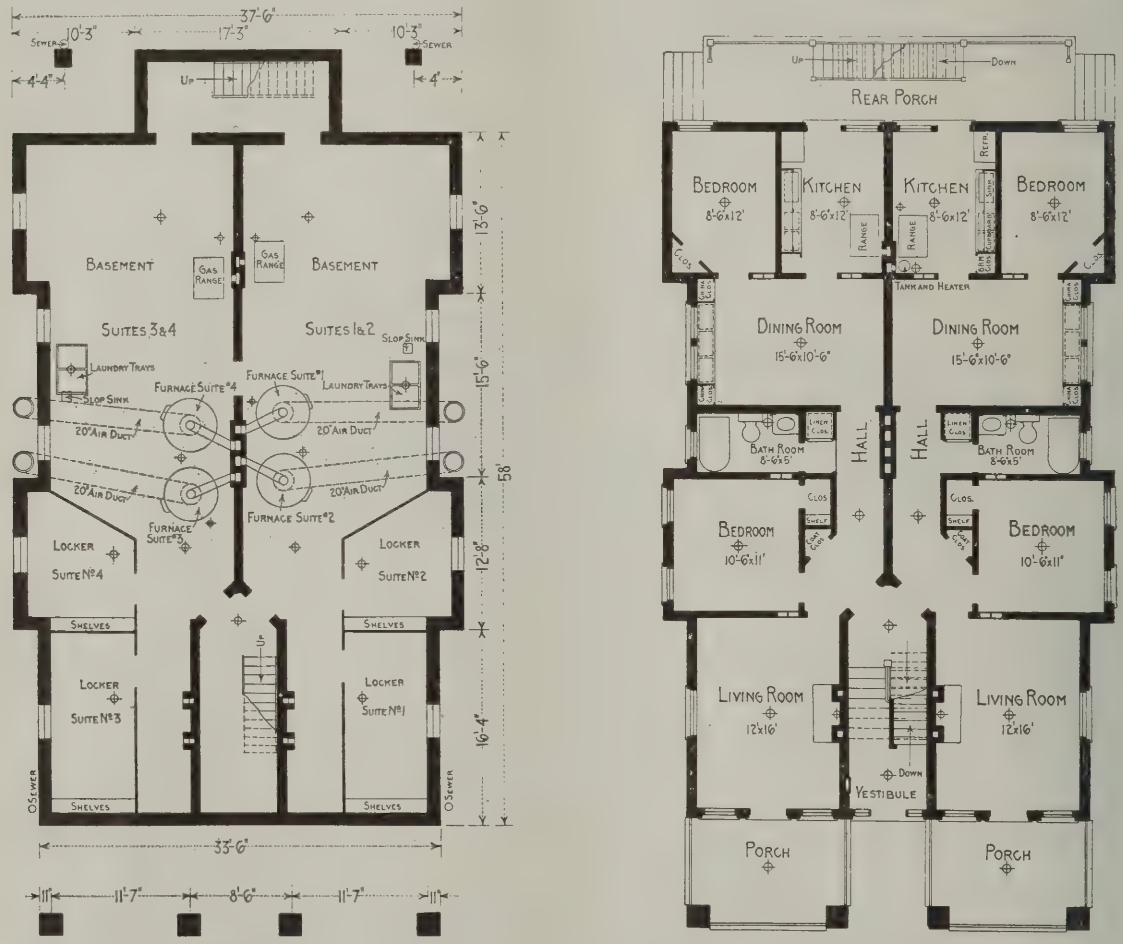


A Four-Family Apartment House—J. L. Cameron, Architect, Cleveland, Ohio.

The basement floor is composed of a 2½-in. layer of concrete mixed in the proportion of one part

Portland cement, and three parts sand and gravel, over which is a finish ½-in. coat composed of one part Portland cement and three parts sand. All chimneys are lined with terra cotta flue lining and are furnished with caps of Amherst blue sandstone 3 in. in thickness. The four brick mantels are made of red pressed brick laid with white mortar joints, the mortar composed of one part "Medusa" white Portland cement, one part slacked lime and three parts white Lake sand. The mantel shelf is of stone 6 in. in thickness. The hearth is of tile and each fireplace is supplied with a No. 230 Covert damper.

The first and second floor joists are 2x10 in. placed 16 in. on centers with two rows of ⅞ x 3-in. double cross bridging for all spans over 10 ft., and one row for a less span; roof rafters, 2 x 8 in., placed 20 in. on centers; and the porch joists, 2 x 8 in., ceiling joists for second floor, 2 x 4 in., and studding, 2 x 4 in., all placed 16 in. on centers. All openings wider than 3 ft. are trussed and have double headers and trimmers. Joists are doubled under all partitions. The roof and the front porch are covered with ⅞ x 6-in. hemlock sheathing.



Basement Plan

First Floor Plan

A Four-Family Apartment House—Floor Plans—Scale 1/16 in. to the Foot

Walls and ceilings are plastered with hard wall plaster and finished with a white putty coat of "white rock" finishing lime, gauged with plaster of paris. The kitchen and bath rooms are finished with Keene's cement to a hight of 4 ft.

The rough flooring is composed of ⅞ x 8-in. matched hemlock. Over this rough flooring in the second story is laid Cabot's double ply deadening quilt. Upon this are nailed 1⅛ x 2-in. furring strips over which is laid the finish flooring. The latter is of ⅞ x 2½-in. kiln dried oak except in the case of the kitchen floors which are laid with No. 1 ⅞ x 2½-in. maple, and the floors of the bath room and front vestibule, which are of tile. The porch floors of the first story are laid with 1⅛-in. cypress. The porch floor of the second story front is covered with ⅞ x 2½-in. white pine covered with canvas. The front porch ceilings are of matched yellow pine.

All exterior finish is of cypress. The front gable has 16-in. cedar shingles laid 4 in. to the weather.

The interior trim for the reception hall, parlor and dining room and stairhall is of oak, and all other finish is of yellow pine.

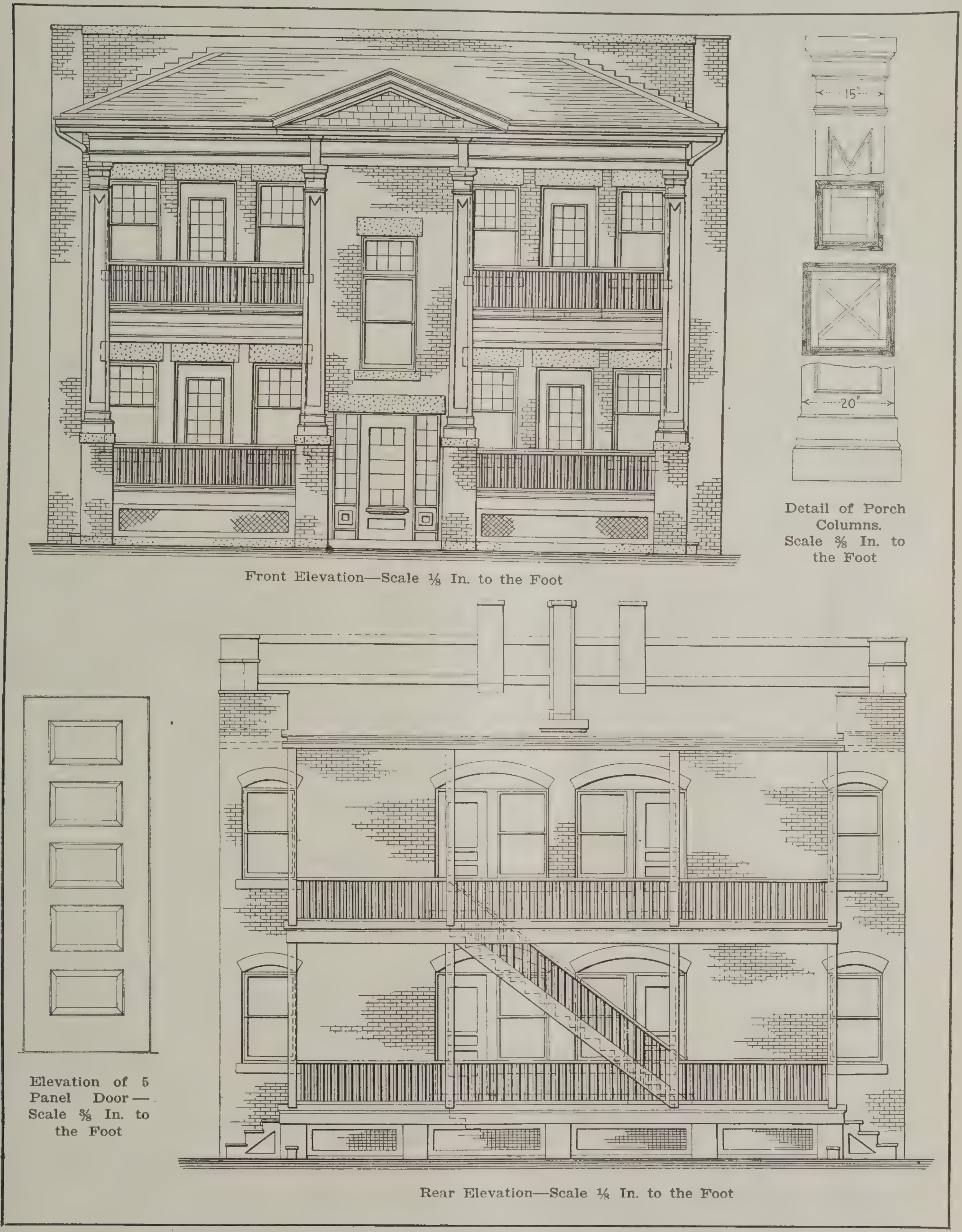
All outside door frames are 1⅜ x 6 in. rabbetted. The inside doors are 1⅜ in. in thickness and the outside doors 1¾ in. All doors are of the five cross panel style and correspond with the interior finish.

All exterior woodwork as well as metal work received three coats of white lead and linseed oil paint. The oak trim in the stairhall, living room and dining room was given a coat of mineral paste filler, tinted to a deep golden oak and finished with two coats of varnish. The yellow pine finish in the two bed rooms and closets was given a coat of orange alcohol shellac and two coats of varnish. The yellow pine finish in the kitchen was given a coat of shellac and two coats of varnish.

The floors of stairs, living room, hall, dining room and the two bed rooms were given a coat of natural mineral paste filler and two coats of Pratt & Lambert's No. 61 floor varnish. The varnish for the wood trim was Newark elastic preservative varnish. The wood trim in the bath room received a coat of white shellac. The Keene's cement in bath room and kitchen was given a coat of varnish size and three coats of white lead and linseed oil brought to a dull finish. All the white work was finished with Scott's "Patinol" white enamel left in the gloss.

The building is wired for electricity with Hart's flush push button switches set in convenient locations. Two three-way switches are provided, one on the first and one set on the second floor, with a three-wire system to control the hall attic lights. Drop cords are installed on all outlets in the basement. Speaking tubes run from the main entrances to the reception hall of each apartment.

One two-part high back Euclid stone laundry tray in each basement is supplied with hot and cold water to each part, with stub brass cocks. The hot water from each of the first and second floor suites on their respective sides is run into a common pipe leading to the hot water cocks and provided with a shutoff at the tank so that water can be drawn from the proper suite when desired. Bath tubs are of the



Front Elevation—Scale ⅛ In. to the Foot

Detail of Porch Columns. Scale ⅜ In. to the Foot

Elevation of 5 Panel Door—Scale ⅜ In. to the Foot

Rear Elevation—Scale ⅛ In. to the Foot

A Four-Family Apartment House—Elevations and Miscellaneous Details

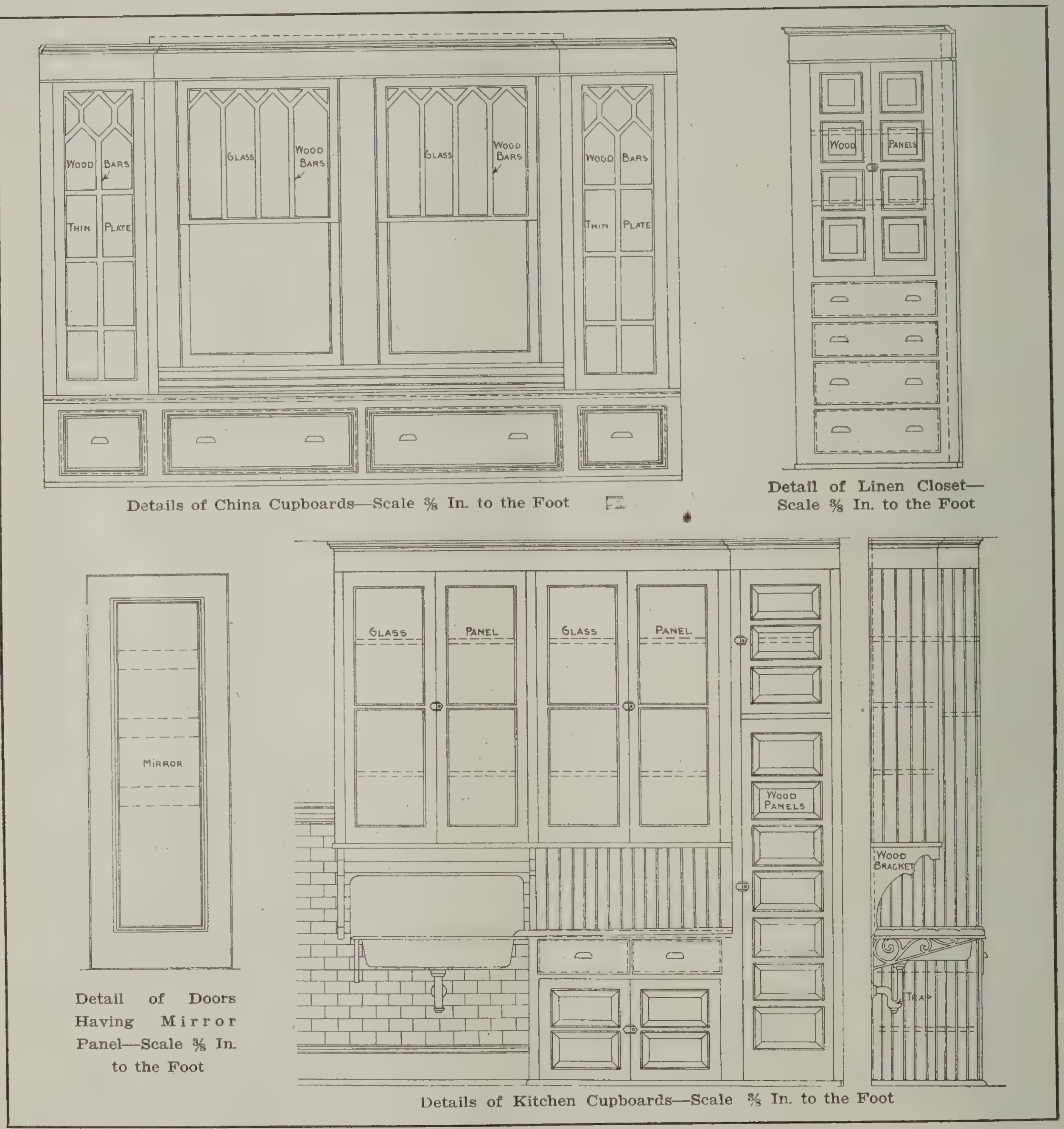
Nemo roll rim white enamel iron type with nickel-plated supply and overflow fittings. Each tub is 4 ft. 6 in. in length and supplied with No. 4½ nickel-plated double Fuller cocks. Lavatories are of porcelain enamel 11 x 15 in. with overflow back and apron in one piece, concealed wall hanger, and Fuller faucets with china handles. The water closets are of the "Regent" plain wash-down type with golden oak seats and tanks, the latter lined with 16 oz. copper. Kitchen sinks are 18 x 30-in. roll rim enameled iron with a 12-in. separate back.

The hot water supply equipment consists of a No. 5 Marvel hot-water heater and a 30-gal. galvanized iron storage tank in each kitchen.

Each apartment is heated by a separate combination, natural gas and coal hot-air furnace, made by the Meech Foundry Co., Cleveland, Ohio. The fire pots of these furnaces are 22 in. and the jacketing is double thick 24-gauge galvanized iron with an air space of ¾ in. All the leaders from the furnace are covered with heavy asbestos paper, pasted and clamped with bands. All risers are made of Perfection wall pipe, manufactured by the Perfection Furnace Pipe Co., Toledo, Ohio. The registers are Auer registers, made by the Auer Register Co., Cleveland, Ohio, and are of old copper bronze finish. The register boxes are lined with asbestos. A damper regulator with solid link chains runs to the hall of each suite to regulate the damper and check drafts. A ½-in. pipe shank with wheel handle, located in a recess wall box in each suite, is used to regulate the gas valves in the furnace.

Natural gas is used for fuel in the furnace, hot-water heaters, fire places, and laundry and kitchen stoves. The gas supply is connected to the laundry stove with a lock shutoff valve so that gas from the proper suite only can be used.

This apartment building was designed and the plans prepared by Architect James L. Cameron, of 812 Prospect avenue, Cleveland, Ohio.



Details of China Cupboards—Scale ⅜ In. to the Foot

Detail of Linen Closet—Scale ⅜ In. to the Foot

Detail of Doors Having Mirror Panel—Scale ⅜ In. to the Foot

Details of Kitchen Cupboards—Scale ¾ In. to the Foot

A Four-Family Apartment House—Miscellaneous Constructive Details

Important Legal Decisions During 1913

Aspects of Architects' Licenses—Phases of Building Contracts Adjudicated—Responsibility for Personal Injuries

By A. L. H. Street

FROM the many decisions of the appellate courts of the country relating to the building trades and reported during 1913, I have selected those most likely to interest the readers.

The Illinois law requiring architects to pass an examination as to their qualifications and to procure a license before pursuing their profession in the state, was upheld by the Supreme Court of that state as constituting a valid exercise of the state's power to protect the public against ignorance and incapacity of professional men. It was, also, decided that the State Board of Examiners of Architects may revoke a license for gross incompetency or recklessness in the construction of buildings, or for dishonest practices on the part of the holder of a license. (102 Northeastern Reporter 193.)

Compromise Agreement for Settlement

Provision in a building contract for settlement with the contractor on certificates issued by the supervising architect does not require the procuring of such certificate where, after a dispute as to the amount due the builder, he and the owner enter into a compromise agreement for a final settlement of all his claims. (Massachusetts Supreme Judicial Court, 102 Northeastern Reporter 436.)

When an architect's right to compensation for preparing plans is made by his contract of employment to depend upon the plans being "satisfactory" to the owner, there can be no recovery of compensation, if the owner is actually dissatisfied, although it appear to others he should be satisfied. (United States Circuit Court of Appeals, Eighth Circuit; Barnett vs. Beggs; 208 Federal Reporter 255.)

Importance of Carefully Checking Plans

The importance of careful checking up plans and specifications before submitting a bid for work based thereon is suggested by a decision of the Oregon Supreme Court, in the case of Leonard vs. Howard, 135 Pacific Reporter 549. Here it was decided that one who contracted to install fixtures in a building, but who, in making his bid, inadvertently overlooked certain things called for by the plans and specifications, could not claim a release from his contract on the ground of mistake. The court said: "The case is not different from what it would have been had they correctly counted the articles to be furnished, and by some mistake or oversight miscalculated the cost of them, and thereby been misled into making an unprofitable bid. Had a fraudulent plan been furnished defendants, or had they by any wrongful act or neglect of plaintiff been induced to make the bid, the case would have been different; but in our opinion the evidence shows that the low bid made by them was the result of a mistake, and this mistake the result of Howard's careless examination of the plans. Under such circumstances neither law nor equity will help them."

A building contractor is not liable in damages to the owner for delay in completing contract work, if no practicable apportionment of the delay caused by him and that caused by the fault of the owner or his architect can be made. (Washington Supreme Court, 132 Pacific Reporter 1015.)

Extension of Time for Contractor

A clause in a building contract entitled the contractor to an extension of time for completion of the work covering any delay caused by the owner, on condition that claim for the extension be presented in writing to the owner within five days of the occurrence of the delay, the duration of the extension to be certified by the architects. Held that it was not necessary that the architects certify the duration of the extension within the five days period, and that this could be done any time before final settlement under the contract. (Pennsylvania Supreme Court, 88 Atlantic Reporter 69.)

When a husband contracts, in his own name, with the knowledge of his wife, for the erection of a building on her land, and the work is carried on with her consent, she cannot prevent attachment of a mechanic's lien against the land in favor of the builder. (West Virginia Supreme Court of Appeals, 77 Southeastern Reporter 655.)

When Owner Cannot Defeat Suit

An owner of a building cannot defeat suit by the builder to enforce a mechanic's lien for the amount due on the contract price by showing that the walls cracked because one end of the foundation was not carried down as far as it should have been to make the structure sound, if the depth of the construction was a matter within the control of the owner under the contract, and he approved the depth to which the foundation was excavated. (United States Circuit Court of Appeals, 206 Federal Reporter 448.) A contract for the erection of a building need not be in writing in order that the builder may enforce a mechanic's lien for the amount due him. (South Dakota Supreme Court, 143 Northwestern Reporter 277.) Although, under the laws of New York, an architect cannot have a mechanic's lien for the price of his plans, he may assert a lien for services in superintending work done under them. (New York Supreme Court, Second Appellate Division; 143 New York Supplement 838.) Where the owner of a building, after receiving notice of claim of materialman for materials furnished a subcontractor, paid the general contractor, both owner and general contractor became personally liable to the materialman. (Texas Court of Civil Appeals, 160 Southwestern Reporter 418.)

A bond given by a building contractor to secure payment for materials extends to his liability for materials furnished but not actually used in the work, he having failed to reserve the right to return materials not used. If he did not direct how payments made by him to a materialman should be applied, the latter was entitled to apply them to other debts due from him, and hold the surety on the bond for materials furnished for the particular building covered by the bond. (Washington Supreme Court, 132 Pacific Reporter 872.)

Floors During Construction of Steel Buildings

Provisions of the New York Labor Law were construed by the Appellate Division of the Supreme Court, to require contractors for the erection of iron and steel buildings, on setting and bolting floor beams, to floor over the entire space, excepting the places necessary for hoisting purposes, stairways and elevator shafts; and it is decided that nothing may be done on the floor in preparation for actual work for further construction until that duty has been performed, but that workmen employed in laying the floor assume the risk incident to its open condition while being laid. (141 New York Supplement 29.) The Massachusetts Workmen's Compensation Act makes an employer liable for injury to a workman inflicted by a fellow employee while intoxicated, if the employer knew that the latter was quarrelsome and dangerous when drunk. (Massachusetts Supreme Judicial Court, 102 Northeastern Reporter 697.) But the law does not cover an accident sustained by an employee while temporarily engaged in work in another State. (Page 693.) A contractor engaged in the construction of a building and authorized to use part of an adjacent street for temporary storage of materials and machinery, must use the highest degree of care to avoid injury to passing pedestrians. (Iowa Supreme Court, 141 Northwestern Reporter 1074.)

Where a building in process of construction was damaged by the negligent manner in which a street contractor conducted blasting operations in an adjacent street, the building contractor's recovery against him was limited to the amount necessary to restore the building to the condition in which it was before the explosion complained of. (Oregon Supreme Court, 136 Pacific Reporter 25.)

Builder's Insurable Interest

A builder who has agreed to erect a building, furnishing the materials therefor, has an insurable interest in the structure, irrespective of payments made to him by the owner. On destruction of a building which was insured and destroyed in the course of construction, the builder was entitled to recover only the value of the building at the time of the fire, less its value when he commenced work. (South Carolina Supreme Court, 77 Southeastern Reporter 1108.)

A defamatory written statement imputing to a contractor dishonesty or fraud in his business is libelous. An article criticising unfavorably the manner in which a school building was constructed was not privileged as constituting a fair and reasonable comment upon a matter of public concern, if it was published maliciously. (Mass. Supreme Judicial Court, 102 Northeastern Reporter 938.)

A firm of contractors who agreed to construct a county courthouse can recover against a railway company for negligent delay in transporting inside woodwork, thus delaying completion of the building, for loss sustained by them for wages paid idle workmen while awaiting the shipment, expenses incurred in tracing the freight, the amount of a forfeiture which they were compelled to pay for the delay in completing the courthouse, and interest on loans which they were required to obtain by reason of the delay; it appearing that the woodwork was especially designed for the building. But the firm is not entitled to recover an item for loss of time sustained by one of the members, in the absence of a showing that the delay in transporting the freight directly caused the loss. (Georgia Court of Appeals, 79 Southeastern Reporter 41.)

A restrictive building covenant in a deed, requiring twenty feet open space, between houses on adjoining lots, is violated by maintenance of a bay window projecting about fifteen inches over the line, but slight projections will not be enjoined by the courts, where the general purpose of the restriction to give each owner sufficient light and air is not violated. (New Jersey Court of Chancery, 87 Atlantic Reporter 158.)

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Cost of Concrete Buildings

In commenting upon the greater use of concrete in building construction and its decided economy for industrial buildings, J. P. H. Perry, the well-known expert of the Turner Construction Company, has the following to say concerning the cost of structures of this character.

The cost of concrete building has not changed materially during the last two or three years, but compared with the early costs the figures have shown a slow decrease. This may be regarded as somewhat remarkable in view of the fact that cement and steel have both been higher the past year than in several years. Cement touched 95 cents a barrel net at the mill and steel reached $1.45 f.o.b. Pittsburgh for bars. Gravel and sand maintained about the same prices for the past two years; labor has not increased its wages to amount to anything, though perhaps its efficiency has improved, due to more experience and greater familiarity with concrete construction.

Concrete buildings to-day cost about 8 to 10 per cent. less than they did in 1905, 1906 and 1907.

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Valuable Woods of the Philippine Forests

The principal kinds of wood in the Philippine forests are the Lauans, which are excellent construction timbers and somewhat comparable in mechanical properties to the Pacific Coast redwoods; Yacal, one of the most valuable because of its great strength and its resistance to destruction by white ants; Apitong, a wood quite comparable to the hard pines of the United States, and various other hardwoods which are used as substitutes for mahogany.

The forest officers of the Philippines state that the islands contain 200,000,000,000 feet of merchantable timber, for which there is a large present demand, and that practically all of it is owned by the government and is available under very favorable terms. In almost all cases the forests can be easily logged by improved machinery and methods.

A Swimming Pool and Dancing Pavilion

Important Features in Connection with the New Home of the Country Club at Wichita, Kans.

THE rapidly increasing use of concrete in connection with all forms of construction work has rendered the building of swimming pools a much easier matter than was the case a few years ago, and as a consequence they are steadily growing in popularity. A very interesting example of the modern swimming pool constitutes one of the important features of the new home of the country club at Wichita, Kansas, extended reference to which was made in these columns last month. At that time we gave a block plan showing the relative position of the various buildings, including the swimming pool and dancing pavilion, which form the basis of the present article. The appearance of the clubhouse with pavilion and swimming pool at the extreme right is clearly indicated in the half-tone engraving upon this page, the view being taken from a point just beyond the first "Tee" of the golf course. The scale drawings show the plan and elevation of the dancing pavilion and swimming pool, with details of water supply, etc. The second half-tone engraving affords an interior view of the dancing pavilion looking toward the orchestra platform.

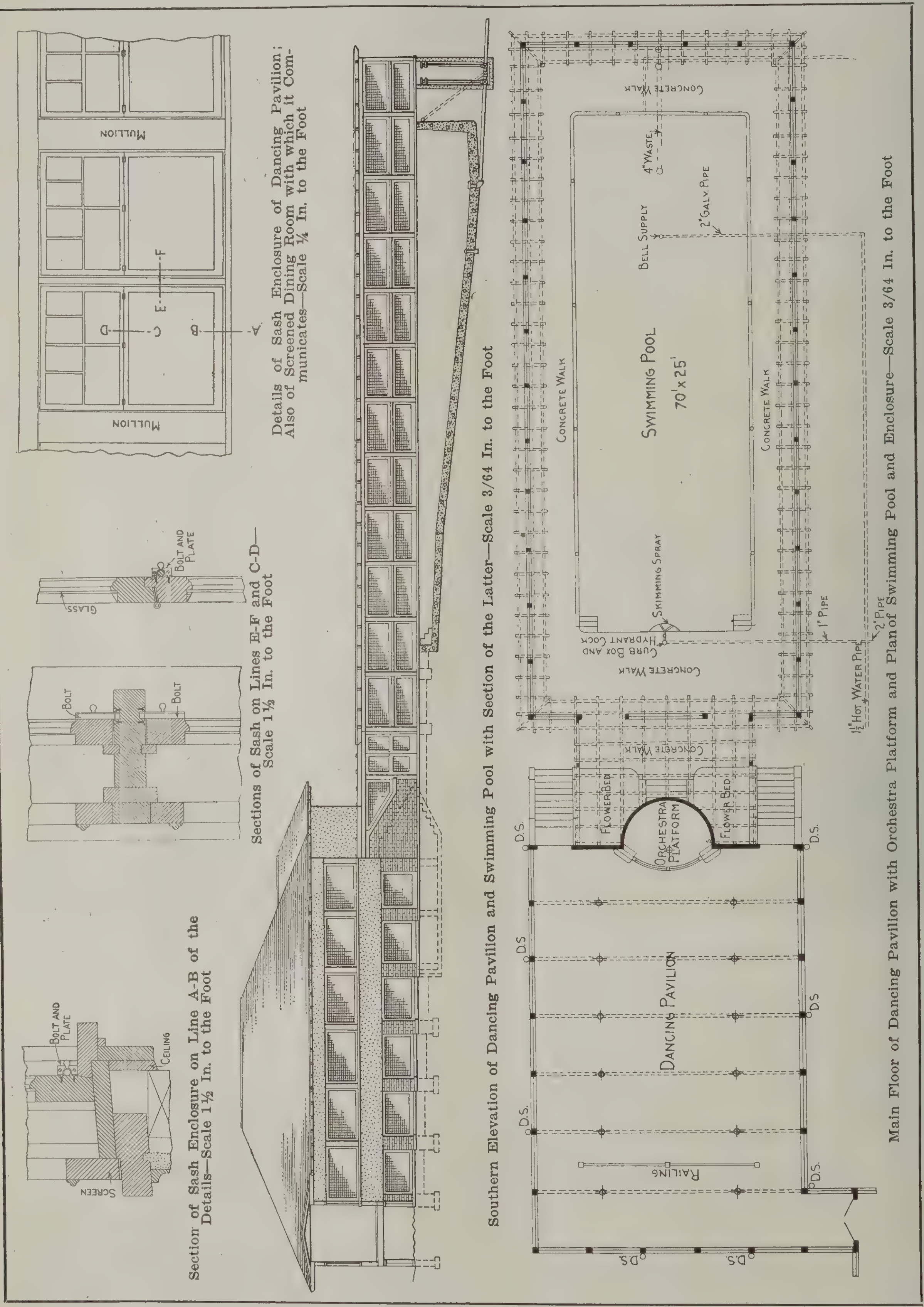
The swimming pool is enclosed with a lattice and has a pergola beamed effect on the top, which will be covered in the summer time with vines, etc. The pool proper is 25 x 70 ft. in size. At the steps leading into the pool, as shown in the sectional view, the depth is 2 ft., from which point for a distance of 15 ft. it gradually slopes until it reaches a depth of 3 ft., and at the point where the 4-in. waste is located the pool is 8 ft. deep.

After excavating for the pool as nearly as possible to the exact dimensions required the clay bottom was wet and then tamped, in order to make a solid bed for the concrete. After this had been done the roughing in for the supply and waste for the plumbing work was put in place. The concrete for the bottom was "poured" in a rather wet mixture to a depth of 2 or 3 in. less than the finished thickness of the bottom, then a reinforcing of ⅜-in. steel rods placed 12 in. on centers was laid with the ends turned up 2 or 3 ft. at the sides. These reinforcing rods were laid both lengthwise and crosswise of the bottom of the pool, and were wired together at the crossings. Upright reinforcing rods of the same size were wired to the upright ends of the bottom reinforcing rods and the ends bent and extended into the bottom concrete for a foot or more so as to keep the angle of the bottom and sides from cracking. Horizontal reinforcing was then wired to the upright rods about 12 in. on centers and extended around the perpendicular corners and lapped each way so as to prevent cracks in the corners.

After all the reinforcing rods had been well wired and fastened in position the side forms were put

Photographic View of Wichita Country Club House with Dancing Pavilion and Swimming Pool Seen at the Right—Henry S. Conrow, Architect, Wichita, Kan.

up and thoroughly tied and braced in position, after which the concrete was poured in to fill the "forms" and the remainder of the bottom. This concrete was a 1:2:3 mixture of cement, sand and gravel rock of a size to readily pass through a 1½-in. ring. The concrete was waterproofed with the specified amount of "Medusa" waterproofing made by the Sandusky Portland Cement Company, Sandusky, Ohio. After the cement had set so that the "forms" could be removed the walls and bottom of the pool received a wash-coat of cement and waterproofing so as to fill all pores and irregularities. Then the cap and the concrete walk, which is 12 ft. wide at the dancing pavilion end of the pool, and 10 ft. wide at the other end, was laid. After the work had hardened sufficiently the drain caps and supply, as well as the waste pipes, were connected and the pool filled, tested and found satisfactory.



Details of Sash Enclosure of Dancing Pavilion; Also of Screened Dining Room with which it Communicates—Scale ¼ In. to the Foot

Sections of Sash on Lines E-F and C-D—Scale 1½ In. to the Foot

Section of Sash Enclosure on Line A-B of the Details—Scale 1½ In. to the Foot

Southern Elevation of Dancing Pavilion and Swimming Pool with Section of the Latter—Scale 3/64 In. to the Foot

Main Floor of Dancing Pavilion with Orchestra Platform and Plan of Swimming Pool and Enclosure—Scale 3/64 In. to the Foot

A Swimming Pool and Dancing Pavilion—Plans, Elevations and Miscellaneous Constructive Details

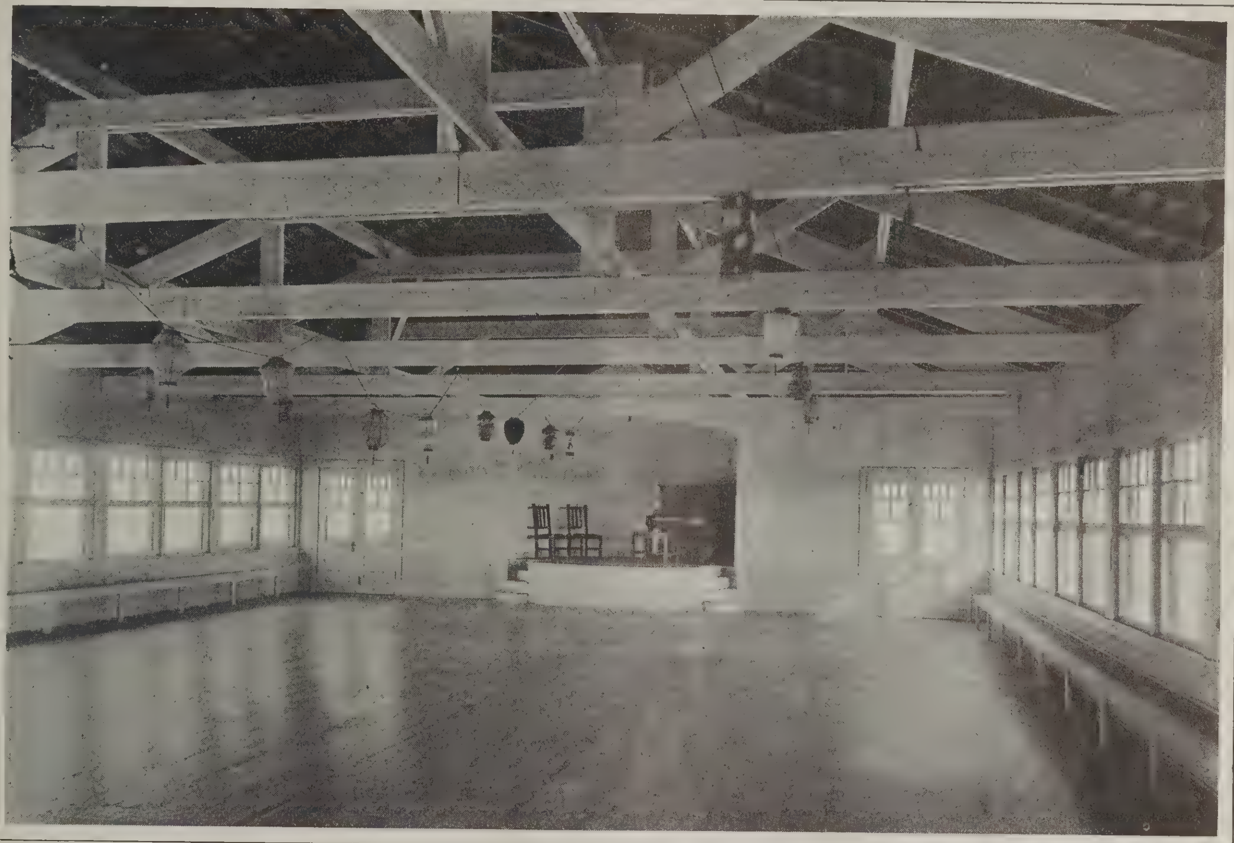
The arrangement of pipes is such that the water from the pool can be used for irrigating the "greens" of the golf course when the pool is emptied, owing to the fact that the bottom of the pool is higher than all except three of the "greens," and the pipes for watering are cross-connected with the waste from the pool. If, however, the water is not required for sprinkling the "greens" it can be turned into a water course that runs through the grounds. The plan of the manhole shown in the details affords an excellent idea of the arrangement of the various valves and piping at that point, while the section through the swimming pool taken on a line of the plan near the 4-in. waste clearly indicates the construction at that point.

The construction of the dancing pavilion conforms in style and treatment to the main building, the contract for which was awarded before the dancing pavilion and swimming pool had been decided upon. The foundation walls to grade are of common hard burned brick, and above grade they are of dark red, round edge paving brick with deep sunk, dark brown mortar joints. The side walls above the foundation where shown on the elevation presented herewith are covered with "rough cast" finish. The roof is covered with Washington red cedar shingles laid 4½ in. to the weather, all shingles having been dipped in Cabot's creosote stain of a dark moss green color before being laid.

The basement has a cement floor 5 in. thick, on top of which is a finish coat consisting of 1 in. of cement and sand mixed in equal parts.

The outside of the frame is sheathed with ⅞ x 8-in. ship-lap boards. Over this, except on the roofs, is a layer of Neponset black waterproof paper made by Bird & Son, East Walpole, Mass., all being well secured in place and all joints lapping 3 in. The sheathing paper also underlaps all casings, cornices, etc. On the side walls, where shown, furring strips were nailed over the sheathing paper, and to these was stapled metal lath, to which was applied United States Gypsum Company's stucco finish.

The interior of the dancing pavilion is not finished, but the framing timbers are painted a light cream color. Under the dancing pavilion are located the dressing rooms and lockers with showers for both the men and the women, all as clearly indicated on the foundation plan. In the dressing room for the women the lockers are 12 in. wide, 18 in. deep and 15 in. high set up 6 in. from the floor, while the men's lockers are 12 in. wide, 12 in. deep and 12 in high.



A Swimming Pool and Dancing Pavilion—View in the Dancing Pavilion Looking Toward the Orchestra Platform and Showing the Ample Provision for Light and Ventilation

The shower baths have slate partitions with nickel-plated fittings and railings, with tile floors and back, supplied with hot and cold water through non-scalding valves.

The pictures relate to the new home of the Country Club at Wichita, Kansas., and the drawings were prepared by Architect Henry S. Conrow, 813 Beacon Building, Wichita, Kansas. The contractors were the Hammond Construction Co.

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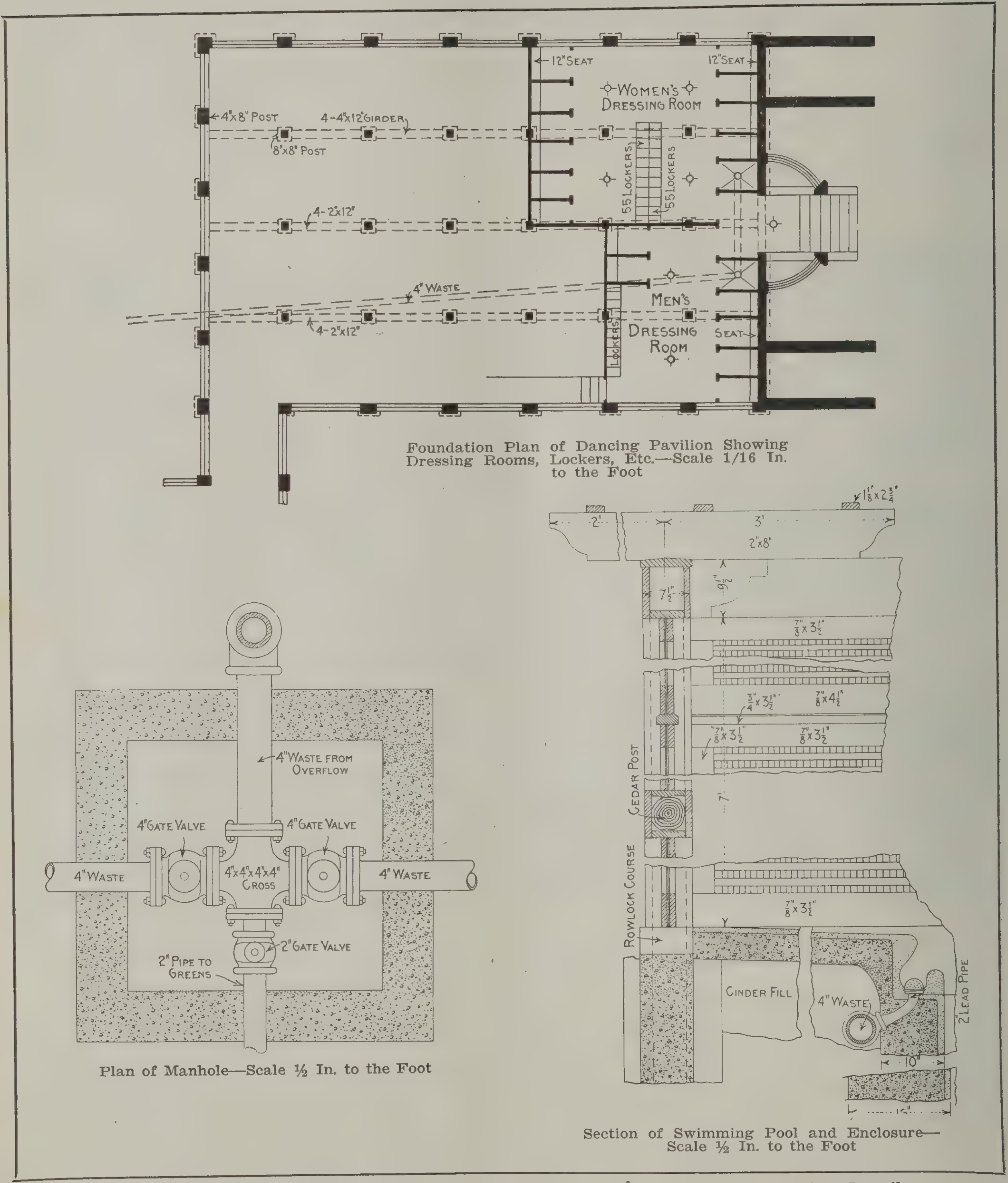
The term of the St. Paul Institute Evening Industrial Schools which closed just before the Christmas holidays, was the most successful in its history, the total registration in the industrial classes having been 271. The second term commenced on Monday evening, January 5, of the current year.

The New Pan-American Building

The plans which have just been filed for the new Pan-American Building show some rather important modifications as compared with the preliminary drawings, due to the fact that it has been necessary to adapt them to the site which has finally been selected—the block bounded by Broadway, Eighth avenue, Fifty-seventh and Fifty-eighth streets. In order to obviate the acute angle formed by the intersection of Broadway and Fifty-seventh street, it is purposed to set the building back 40 ft. from the line so as to create a circular façade at this point, from which the building will be carried in a straight front to Fifty-eighth street and to Eighth avenue. The revised drawings of Architect Francis H. Kimball provide for a much higher structure than originally contemplated. It will have an altitude of 889 ft. divided into about 56 floors with ceiling hights ranging from 15 to 30 ft.

It is pointed out that besides creating a plaza approach for the new structure the setback from the street will afford space for a subway station.



Foundation Plan of Dancing Pavilion Showing Dressing Rooms, Lockers, Etc.—Scale 1/16 In. to the Foot

Plan of Manhole—Scale ½ In. to the Foot

Section of Swimming Pool and Enclosure—Scale ½ In. to the Foot

A Swimming Pool and Dancing Pavilion—Plan and Various Constructive Details

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According to newspaper reports Berlin, like some of the cities in the United States, has been suffering from an excess of building operations. The statement is made that 23 per cent. of the builders in Berlin are without work, and that from 12 to 30 per cent. of the members of the building trades in different parts of Germany are idle.

Quantities and Quantity Estimating

A Bit of Satire Touching Some Pet Hobbies Which Broad-Minded Architects Cannot Fail to Appreciate

By Le Roy E. Kern, Architect*

WITH feelings of surprise, horror and shame, I read the article by Sullivan W. Jones, which appeared under the above title in the December issue of *The Building Age*. The surprise was at the article being published; the horror was at the thought of what would happen to us architects if the public should begin to require us to show and specify neither more nor less than we meant for the low bidder to furnish—the shame was that a member of our most honorable profession should cast aspersions on its most sacred, revered and time-honored traditions.

Written by Prominent Architect

Had the article been written by some practically unknown architect we could have treated it with silent contempt. This, however, was not the case. It was written by a member of one of the leading architectural firms in the country, and might possibly be read by some of our clients. If it is, then we are ruined forever.

It would not have been nearly so bad if he had merely hinted in general terms something to the effect that there might possibly be some slight chance for a little improvement or rather change in some of the details of the way that in some places the building game was being conducted. No one then would have paid a particle of attention to it; we could have said to ourselves that it does not apply to us personally and would have regretted that there was no way to rid the profession of those incompetent members.

He, however, not only states that *our* drawings are unintelligible and lacking in pertinent information, but (shades of our forefathers, what are we coming to?) that *our* specifications are rubbish.

In its fundamentals this specification is the same in all architects' offices. It has been handed down from office to office and from father to son for untold generations. Personally I believe forever. It has been copied millions upon millions of times, but never written. Some one, though, must have written the first one, unless "in the beginning" it was created.

Specifications Still in Original Form

Trade unions have come into existence, new materials have been put on the market, new methods of construction have been advanced, but in spite of all this we have been able to preserve our specification in practically its original form. Should anything in the world be held in more veneration? Why even to hint that it might be changed a little should be regarded as worse than any known criminal offense. What, then, shall we do to one of our own profession and one who ought to know what he is talking about when he says that our specifications are rubbish?

What difference does it make to us that the courts of law do not uphold our General Conditions? Some day some archæologist will dig up the original signed contract copy of the specifications for the oldest pyramid. It will be well for him, however, to have his find witnessed by several disinterested parties of unquestionable veracity, for otherwise he will most assuredly be accused of having translated into Egyptian the greater part of a modern specification.

When this find is made it will be indisputable proof that all buildings that ever had any specifications had the same general conditions, standard clauses, and said the same nasty things about what they were going to do to the contractor in case he made an error or failed to correct all the architect's errors. With this original document to back us up we ought to be able to have the laws changed to fit our specifications.

In place of the contractor being pessimistic about any change it seems to me that his position is about the same as that of the blacksmith who when asked why he allowed his wife to beat him replied that it did not hurt him and it amused her.

The Pleasure of the Architect

The only pleasure the architect has in life is reading his General Conditions and blanket clauses to his new client. The contractor, if present at this reading, never raises his eyes and appears to be suffering some great mental anguish. He does not really feel that way. He knows that the architect does not mean a word of it. That is the way he is expected to look, and it would spoil the effect of the whole thing if he did not look that way.

In the subject matter proper of the average specification there have been some changes made from year to year. To what extent these are due to inaccurate copying I am unable to say. I am convinced, however, that this is not the reason for them all. Some have been made in an honest effort to show the bidder that the architect really thought he wanted this or that particular thing done this or that way. I have heard that in some instances this has been found to be a help to the bidder. However, I am afraid that they have often prevented his being awarded the work by raising the question of doubt in his mind as to the other requirements.

As for the change to the Quantity Estimator as suggested by Mr. Jones, I am not sufficiently well posted to express an opinion, but on the face of things it looks as though it would be a vast improvement, especially for the smaller offices. Of one thing, however, I am certain and that is that it could not possibly be any worse.

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*Formerly specification writer in the office of Bruce Price & De Sibour, architects, New York and Washington.

Hoisting Rigs for the Builders' Use—V

The Guy-Derrick and the "Stiff-Leg" Derrick—Some Details of Their Construction and Operation

By Edward H. Crussell*

AFTER the gin pole comes the boom derrick, usually called guy-derrick to distinguish it from the stiff-leg derrick, a near relation which we shall presently consider. The guy-derrick is nothing but a gin pole with a boom attached. All that has been set forth in previous installments of this article regarding the erection, placing of guys, deadmen, etc., of the gin pole can be applied to the guy-derrick and indeed to most of the hoisting apliances to be later described.

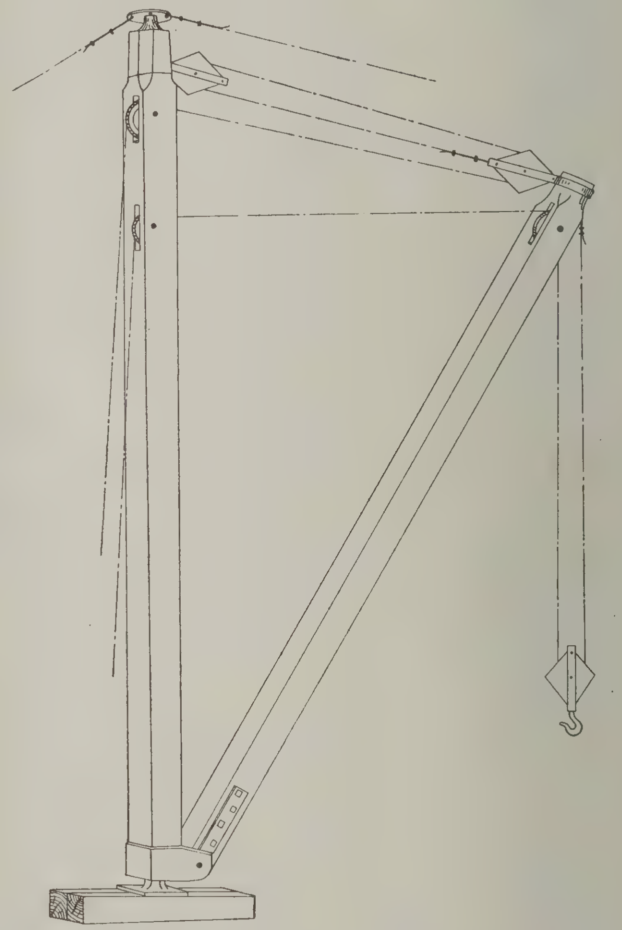
It is probable that in the first derrick the foot of the boom was attached to the mast with a rope sling. This arrangement can still be sometimes seen along the waterfront where old-time barges are unloading brick, sand, etc.

A rope attachment is, of course, out of the question in a modern appliance, Fig. 29 illustrating what is perhaps the most simple form of derrick in use to-day. Iron work for a derrick of this stamp can be made by the local blacksmith, but many manufacturing firms are nowadays prepared to supply iron work for derricks of almost any reasonable size and capacity, and for a lasting or permanent article it will in most cases be better and cheaper to procure the iron work from them. Given the size and capacity required they are usually prepared to do all the necessary calculating and iron work purchased from them will as a general thing be more correctly proportioned than when made by some one who is not a specialist in that particular line.

In Fig. 29 the hoisting line is shown running from the top of the boom to a point near the top of the mast. This is the usual practice in hand derricks, but in power derricks it more often runs from the top of the boom to the foot of the mast and thence to the source of power. Running the hoisting line to the top of the mast has a drawback which is only noticed in special cases, and that is if the boom is elevated beyond a certain point the weight of the load has a tendency to raise it still higher and close the boom and mast together like a jack-knife. To avoid this the writer has in one case seen the crab of a hand-power derrick attached to the back of the boom instead of to the back of the mast, the latter being the usual practice.

The double drum crab to accommodate both the boom and the hoisting lines is the best for a hand-power derrick, but in work where it is unnecessary to frequently raise or lower the boom a single drum can be made to serve the purpose, the boom being manipulated by hand when without a load. In this latter case the boom line is simply made fast to a cleat on the back of the mast.

Guy-derricks usually have the boom from 5 to 10 ft. shorter than the mast so that the boom may be swung a complete circle. The guys on level ground should be three times the length of the mast but are frequently made longer in order to clear the boom or to take advantage of some natural anchorage. For the purpose of clearing the boom one or more of the guys is sometimes fitted with a strut, as shown in Fig. 30. In some cases the derrick guy is made fast to the top of the strut and two guy lines run from the strut to the ground. In other cases the derrick guy is taken over the top of the strut to the anchorage, which makes guying of the strut of less importance, although something is still required to prevent it from "kicking" sideways.



Hoisting Rigs for Builders' Use—V—Fig. 29—A Hand-Power Boom Derrick

Very often guy-derricks are erected in pairs as

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*Copyright, 1914, by Edward H. Crussell.

for instance in building an arch across a stream. If a derrick is erected on each bank, work in the center which is beyond the capacity of either derrick can be handled by attaching both of them to the load. In like manner material can be carried clear across the stream by attaching the hoisting lines of both derricks to the load and slacking off one while hauling in on the other.

When erected in pairs the space between the derricks can be kept clear of guy lines by fixing an overhead guy between two mastheads, the side and rear guys being, of course, anchored to the ground in the usual way. Derricks for heavy and important work often require more than four guys. Guy caps can be procured having connections for as many as 12 guys, although this number is seldom necessary.

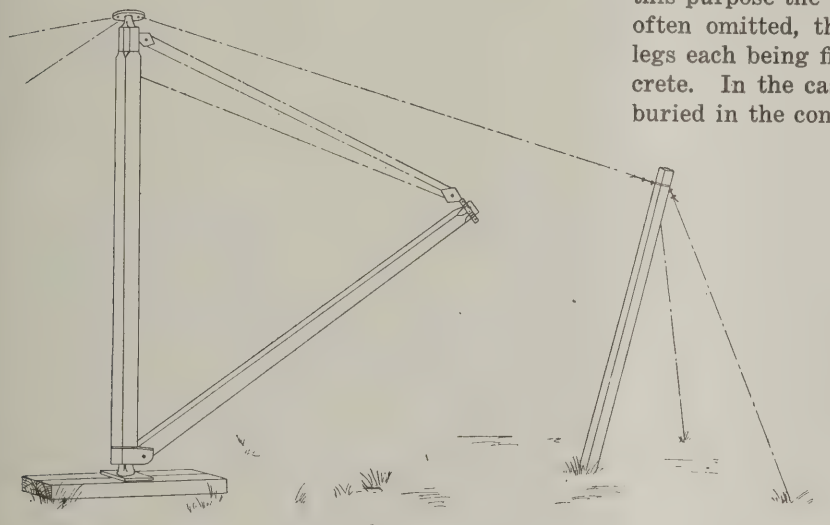

Fig. 30—A Boom Derrick Fitted with Guy Strut

In Fig. 31 is shown a "stiff-leg" derrick. In it rigid struts take the place of guys. Only two are needed set at right angles with each other, thus allowing the boom to swing practically three-quarters of a circle even though it be twice the length of the mast.

The longer the boom the less the capacity of the derrick, and if we remember this and make allowance for it the length of the boom can be increased out of all proportion to the mast. Any visitor to San Francisco the year after the fire could have seen stiff-leg derricks of every conceivable size and proportion. The air was full of them in all directions, straight up, across the street and back in the alley. The writer remembers seeing one with a mast of about 20 ft. in hight and a boom fully 75 ft. in length.

The stiff-leg derrick is perhaps made in a larger range of sizes than any other single form of hoisting device, reaching all the way from the little 4 x 4 affair which can be moved by one man up to the machine with a 100-ft. boom of 50 tons capacity. Wooden stiff-leg derricks of the larger sizes require a strut in the center of the leg as indicated by the dotted lines in Fig. 31.

The old-time method of anchoring these derricks was to build a platform on the outer ends of the sills and load them down with large stones. This method is still in use, but the more modern way is to anchor them with concrete, giving great rigidity.

A simple method of anchoring the smaller sizes is to excavate two holes in the ground at the proper points—the outer ends of the sills—enter a short piece of wire cable in each hole with the ends projecting and then fill the holes with concrete. After the concrete has set the derrick can be fastened to it by means of the pieces of cable, using wire rope clips for the fastening. This is a good method of anchoring in a public thoroughfare or at any point where the derrick forms an obstruction that must be removed and replaced from time to time.

Now that concrete is coming so much into use for this purpose the sills of the stationary derricks are often omitted, the foot of the mast and the stiff legs each being firmly fixed to a solid block of concrete. In the case of the stiff legs they are often buried in the concrete for some distance instead of being fastened to the top of it.

Sometimes in manufacturing works, storage yards, etc., a stiff-leg derrick is required that will swing a full circle. This is known as a full circle stiff leg, and its arrangement is shown in Fig. 32 on the following page. The stiff legs are set at right angles with each other as before and the ends of the legs sunk in the ground and provided with sills and bracing below the surface or they may be embedded in concrete according to preference and convenience. They may also be provided with a platform and weighted with stone, but the anchorage below the surface takes up the least yard room. The brace which runs from the top of the legs to the mast is usually stiffened with truss rods.

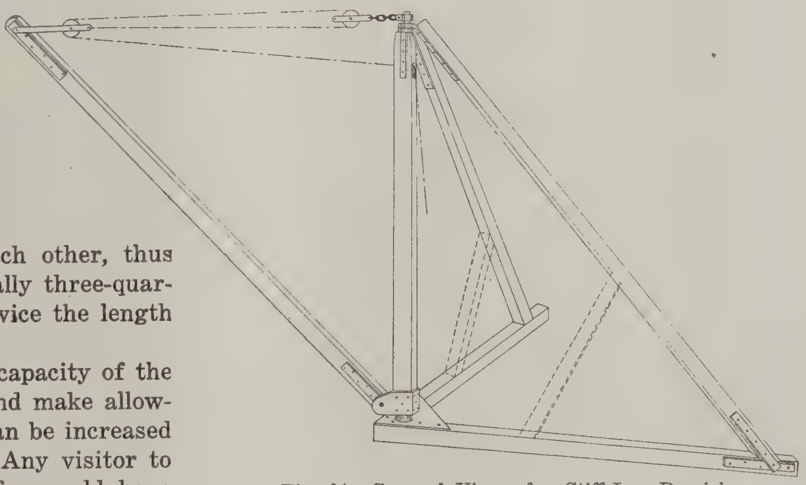

Fig. 31—General View of a Stiff-Leg Derrick

Hoisting Rigs for the Builders' Use—V

Stiff-leg derricks of various designs are often fixed to barges or railroad cars, in which event they are called "barge derrick" or "car derrick," although sometimes the name is reversed and instead of saying "car derrick" we say "derrick car."

(*To be continued*)

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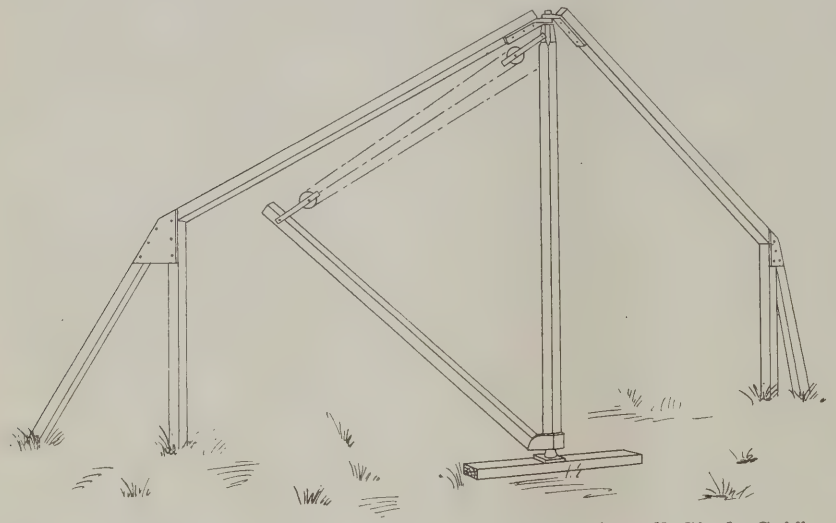
What is said to be the largest remaining virgin stands of white pine are found in Minnesota.

Forest Products Exposition

With the affairs of the Forest Products Exposition definitely shaping themselves and with reports at the headquarters in Chicago from all sections of the country and branches of the wood industry of America, direct and affiliated, there is every indication that the undertaking will prove even more productive of results than hoped for in the original calculations. The principal lumber associations and affiliated organizations have practically determined on a more or less extensive representation and participation, various trade organizations are planning, not only representation in the way of exhibits, but attendance in a body. A large number of concerns and individuals have signified their intention of taking space and showing their product, many of them operating in the process of production, and Manager George S. Wood is having the usual experience in preparing a pioneer industrial exposition in urging the final decisions in many directions, precedent showing that many of the most important interests have procrastinated until such time as reservations already made and contracted made it utterly impossible for the management to provide the space and location mutually desired. In other words, some of the most important representatives of an industry, urged by every logical argument, did not see their opportunity and make arrangements for space and location required for their exhibits.


Hoisting Rigs for Builders' Use—V—Fig. 32—A Full Circle Stiff-Leg Derrick

According to advice received at the Chicago headquarters the exhibits of the lumber and allied associations alone will provide one of the most interesting and instructive displays ever arranged for an industrial exhibit in this country. It has practically been decided that the United States Forestry Service will display a number of most instructive incidentals to the service, including fire tower, equipment station, timber sale models, erosion models, relief map, mine timbers, greenhouse benchboards, collection of scientific instruments, national forest model, wood utilization exhibit, wood distillation exhibit, specimens of wood waste products manufactured from such waste and bromides, transparencies, maps and charts. It is understood that some of the state forestry divisions will make similar exhibits, yet enough unlike to be very interesting.

With a view to inviting representation of the organized bodies and individual members, as well as attendance, at both Chicago and New York, Manager Wood will attend the following conventions and review the purposes, progress and possibilities of the Forest Products Exposition: Indiana Hardwood Lumbermen's Association, Indianapolis, Ind.; Nebraska Lumber Dealers' Association, Lincoln, Neb.; Northwestern Lumber Dealers' Association, Minneapolis, Minn.; American Wood Preservers' Association, New Orleans, La.; Southwestern Lumbermen's Association, Kansas City, Mo.; Retail Lumber Dealers' Association of New York; Albany, N. Y.; National Association of Box Manufacturers, French Lick, Ind.; Ohio Association of Retail Lumber Dealers, Cincinnati, O.; Central Association of Lumber and Sash and Door Salesmen, Chicago, Ill., and Retail Lumber Dealers' Association of Pennsylvania, Pittsburgh, Pa.

As several of the leading woodworking machinery manufacturers have indicated their intention of installing exhibits, with wood manufacturing plants being represented and any number of accessories having exhibits, a complete demonstration of the utility and possibilities of wood in all its phases is assured.

Gum Lumber Manufacturers' Association

Growing out of a meeting of prominent manufacturers of red gum which took place in Memphis some weeks ago there has been organized what is known as the Gum Lumber Manufacturers' Association, the objects and purposes of which are to secure a full understanding of conditions surrounding the gum industry in the territory covered by mills operated by members of the association, and also to adopt such measures as will provide for improved methods of manufacture and marketing. It is also the purpose of the association to disseminate such information as will tend to promote the general welfare of gum manufacturers. The officers elected for the ensuing year are: President, C. L. Harrison, of Cape Girardeau, Mo.; first vice-president, J. W. McClure, of Memphis, Tenn.; second vice-president, F. E. Gary, of Turrell, Ark., and treasurer, S. M. Nickey, Memphis, Tenn.

There was a very interesting exhibition on the afternoon and evening of January 20 of the work of the pupils of the Baron de Hirsch Trade School at 222 East 64th Street, New York City. The examples of work were all cleverly executed and demonstrated in a most striking manner the proficiency of the pupils of this well-known institution.

Metallic window sashes are beginning to be used in India in connection with factory construction.

Banquet of Chicago Builders Exchange

Members of the Organization Celebrate the 30th Anniversary of Its Formation—Many Interesting Addresses

THE Past Presidents' night, held in commemoration of the thirtieth anniversary of the Chicago Builders' and Traders' Exchange, was celebrated in the form of an elaborate banquet at the Auditorium Hotel on Thursday evening, January 8, covers being laid for more than 200 members and guests.

The menu consisted of eight courses, with specially selected "B & T" liquors of a quality calculated to tempt the most fastidious epicures. The intervals between courses were devoted to popular songs and music, the diners providing the former and the Kloers Orchestra the latter. The entertainment for the evening included a piano monologue by J. S. Meck, a baritone solo by O. J. Kloer, and humorous sketches by C. W. Hitchcock.

Director C. W. Jones proved an able toastmaster for the evening, and prior to his introduction of past presidents, gave an outline of the progress of the association since its formation in 1884.

Of the more interesting speakers of the evening giving retrospective sketches of the Exchange were Charles W. Gindele, president in 1893 and 1899; George H. Fox, president in 1895; W. W. Crilly, in 1897; John Rawle, in 1900, 1907-8; Daniel Freeman, in 1905, and John D. Corlett, who has been president for the past two years. William M. Copeland also entertained his hearers with an address entitled "The Building Exchange."

The reminiscences of all speakers were most entertainingly given and showed how much the Exchange has progressed, its high prestige in the city of Chicago and its strong financial condition, reflecting a tribute to its founders and a credit to its members. The festivities of the evening were brought to a close near midnight, ending a most propitious occasion at which business worries were forgotten and replaced by a round of good fellowship and enjoyment.

The committees doing good work in this connection were the anniversary committee, of which Charles W. Jones was chairman, ably assisted by O. W. Jovien, F. E. French, John Sunderman and J. J. Walsh, and the reception committee, which in addition to the Exchange executives, was composed of A. E. Yauger, E. B. Perkins, James Turner, C. J. McKeon, Louis Carson, A. C. Jaeger, C. H. Wright and F. S. Shoemaker.

View in the Banquet Room of the Auditorium Hotel when the Members of the Chicago Builders and Traders Exchange Celebrated the 30th Anniversary of Its Formation

A Low Cost Dutch Colonial House

Description and Outline Specifications of a Story and a Half Clapboarded Residence for a Country Location

THIS house, which forms the basis of our supplemental plate the present month, the plans of which are presented on the opposite page, has been designed to embody compactness of plan without sacrifice of comfort in the size and number of rooms. A lot 50 ft. wide by 100 ft. in depth is sufficient for this dwelling and in such case the front steps should be about 30 ft. from the street.

The living room, which is the conspicuous feature of the first floor, is 12 x 25 ft. in dimensions and is provided with a fireplace and ingle nook seat which are visible from the entrance door of the house. French casement doors lead from this room and from the kitchen to the private porch, which may be used for a dining room in summer. Special attention has been given to the design of the kitchen, one of the most important rooms of a house.

There are two chambers on the first floor with closets for each, and two on the second floor, together with a sewing room in the front of the house lighted by a dormer window. Besides the two ample clothes closets for the second floor chambers, there is a coat room on the stairway landing between the first and second floors.

The Foundations

The foundation walls of the building are of concrete 8 in. in thickness, supported on footings of concrete 10 in. thick and 22 in. in width. The foundation of the porch is of concrete and consists of 8 x 8-in. piers, between which is a concrete wall 6 in. thick. All concrete is a 1:4:6 mixture.

The walls and ceilings of all rooms are plastered two coats, with a sand finish in the living room and a hard smooth finish in all other rooms. The chimney is built of common brick laid in cement mortar, all flues being lined with vitrified flue lining. The chimney breast below the mantel shelf is composed of tapestry brick and the hearth is laid with 6 x 6 in. tiles.

All framing timbers are of spruce. The floor beams are 2 x 8 in., and the studs 2 x 4 in., all placed 16 in. on centers; the attic floor beams 2 x 8 in.; the rafters, 2 x 6 in.; the porch floor beams, 2 x 8 in., and the porch ceiling beams, 2 x4 in., all placed 20 in. on centers. The corner posts are 4 x 4 in., and the sills 4 x 6 in.

The exterior frame is covered with hemlock sheathing, placed diagonally, over which clapboards are laid.

The roof is covered with red cedar shingles laid 5½ in. to the weather and the porch roof, with the same material, placed 4 in. to the weather, the shingles being stained a dark red.

The flooring is of North Carolina pine, the first floor being double with floor felting between the finish and the rough flooring. The floors of the second story rooms are single.

All trim and doors are of cypress. The window and door frames, and all sash, outside trim, and clap boards are of pine.

The Trim of the House

The trim throughout the house is finished in a simple manner; the wood casings are narrow and perfectly plain. The living room trim is stained and brought to a dull finish. The floor of the living room is varnished and waxed. The plastering and the panels of the living room are tinted with a water-proof stain. The walls of the kitchen and dining room are painted. All bed room walls are tinted and the trim is stained so that the natural grain of the wood may be seen. All outside walls are painted with two coats of white lead and pure linseed oil. All ceiling boards on porch ceiling and under side of cornice are varnished. The sheet metal work is painted two coats of lead and oil on both sides. The interior woodwork is filled with a good wood filler and painted two coats of paint.

One line of plumbing serves the kitchen and bath room. All exposed pipes have nickel-plated finish. The bath room plumbing fixtures consist of a wash basin, bath tub and water closet, all porcelain enameled. The kitchen fixtures include one glazed earthenware wash tray, one iron sink, and a combination coal and gas range, with a 35-gal. galvanized iron boiler attached.

The house is piped for gas and wired for electricity and combination fixtures are furnished. The house is intended to be heated by means of a hot-air furnace.

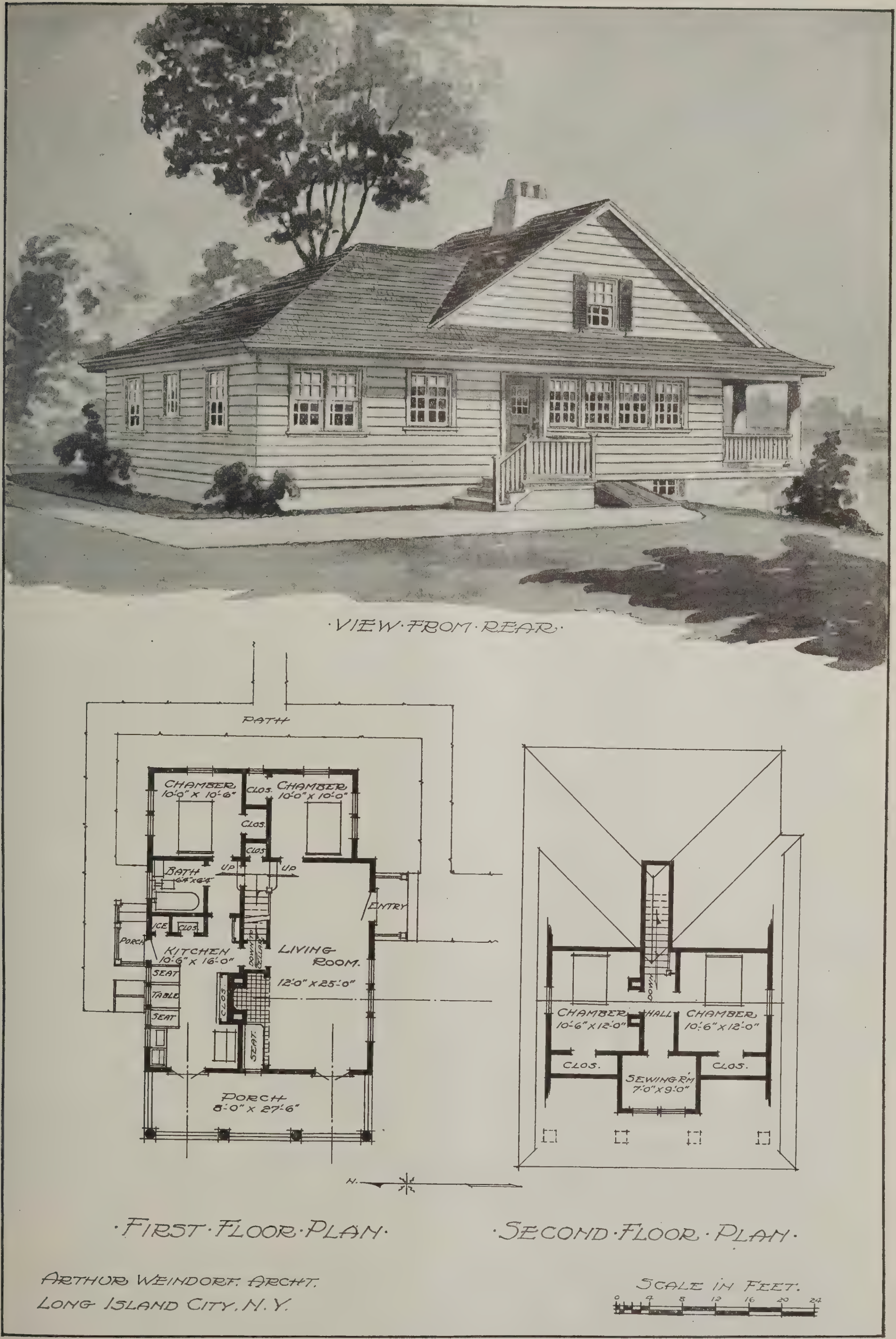
Cost of Materials and Labor

Following is an estimate of the cost of the materials and labor for the construction of the house here described:

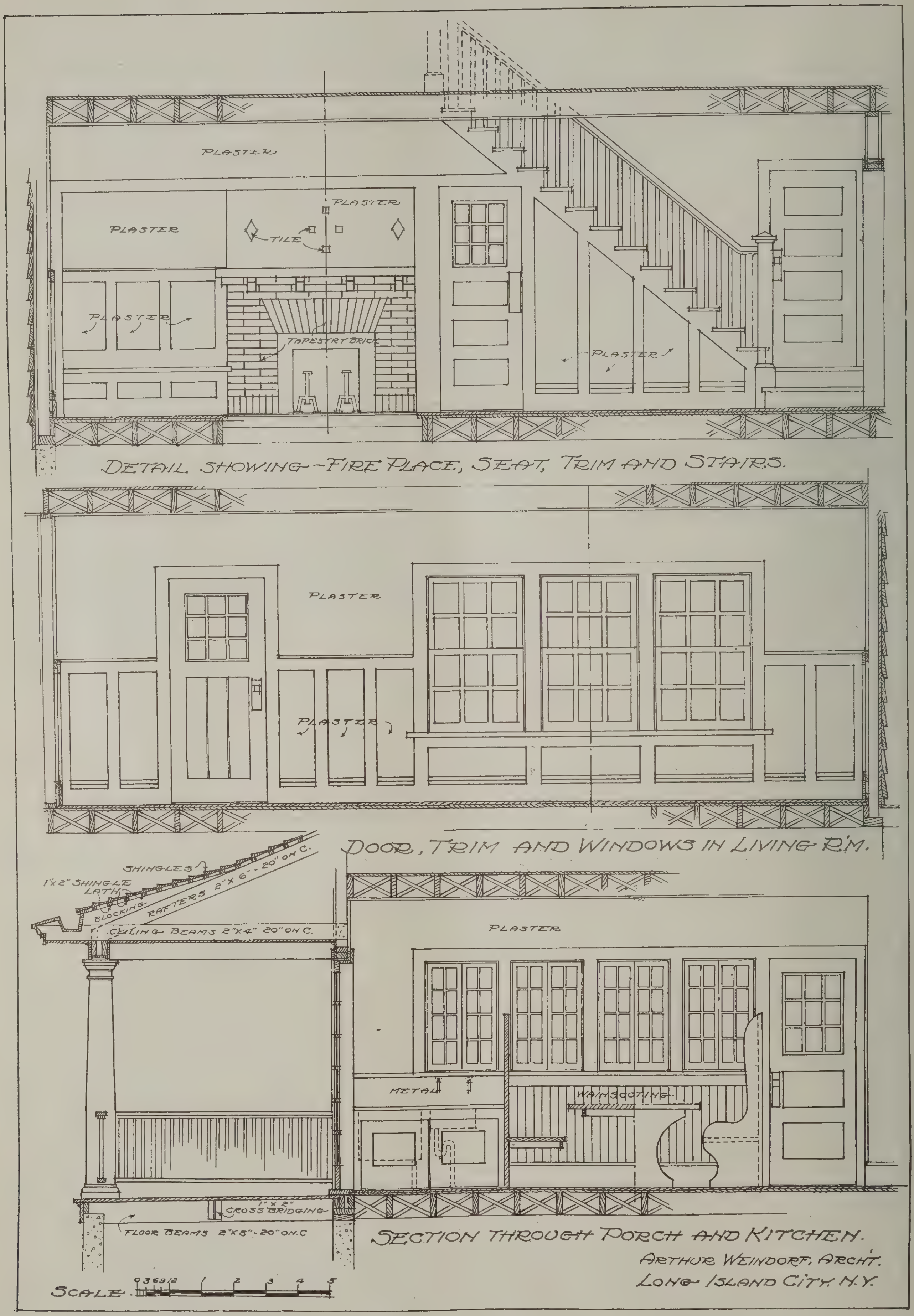
Excavating and grading	$100.00
Masonry work including concrete footings, foundation walls, chimneys and fireplace	450.00
Plastering	300.00
Carpentry work, including lumber bill, mill work, labor, etc.	1,700.00
Hardware	60.00
Metal work	90.00
Painting, staining and tinting	230.00
Plumbing and gas fitting	220.00
Heating	200.00
Electric wiring and bell work	50.00
Fixtures (combination gas and electric)	30.00
	$3,430.00

The above figures include the contractor's 10 per cent profit and are figured on a cubical contents estimated as follows: Size of house, 36½ ft. x 27½ ft. x [approximate height] 20 ft., equals 20,075 cu. ft. Size of porch, 8 ft. x 27½ ft. x [approximate height] 12 ft., equals 2,640 cu. ft. The total cubical contents is therefore 22,715 cu. ft., which, figured at a unit price of 15 cents per cubic foot, gives the approximate cost of $3,407.25.

This house was designed and plans prepared by Arthur Weindorf, architect, care of *The Building Age*, or Long Island City, N. Y.



Plans and Elevation of the Low-Cost Dutch Colonial House Shown on Colored Supplement



Miscellaneous Constructive Details of the Low-Cost Dutch Colonial House shown on Colored Plate

Pergolas and the Contracting Builder

Suggestions Concerning Pergolas which May Be of Interest and Value to the Builder and Carpenter-Contractor

By Warfield Webb

WITHIN the past few years the growing desire to live in the open has caused a wonderful change in the matter of construction details, and the genius of the builder has been put to a marked test in order to meet the demands of the times. The porch, long ago looked upon with reverence, has been developed from year to year, and the changes made possible in this way have been the underlying factor in causing lawns and the entire surrounding landscape of a home to undergo a different aspect.

One of these changes has been a revival of the time-honored pergola. The term revival is used from the fact that the pergola is not a new style of outdoor decoration, but a feature of lawn architecture that was common in Greece and Rome centuries ago. It is but a revival of an ideal form of increasing the beauty of the home grounds, and making the home a much more beautiful habitation. The pergola has its place in exterior decoration, and it has its meaning, and its details should be given at least a fair consideration by every man who builds.

There is sufficient reason for this when the matter is looked into with any amount of care. The primary consideration for the man who wishes to erect a pergola on his lawn is to have a careful study made of the grounds. This is generally placed in the hands of a landscape architect, but more frequently in the hands of an architect. However, it is not absolutely necessary that an architect be employed if the contractor is a practical man with good ideas as to constructive details. The matter only demands on the part of the contractor a careful survey of the lawn. The location of the pergola depends upon the cost, the size, the material and the labor.

While no definite rules can be given as to an individual case, there are general rules that are very important. After the geenral plan of the pergola has been noted, its dimensions, general style and the kind of material wanted, a rough sketch should be drawn by the contractor and then sent to a manufacturer of the materials that enter into this line of work. The height of the columns, the style of architecture, the number of columns and kindred details are very essential to secure correctly made materials and to decrease other troubles and delays that will be sure to arise. He should not submit a careless outline and leave it to the manufacturer to guess or to write for more definite information before proceeding with the work.

Much of the pergola work is constructed with wood columns, girders and rafters. The kinds of stock vary with the climate, and what will prove of value in one section will not always give satisfaction in another locality. The most generally used woods are white pine, cypress, white cedar, red cedar, yellow poplar and fir. To make the columns perfectly durable the timber is thoroughly air dried before being manufactured into the pergola materials. There are two styles of columns in use today. The solid, nearly always bored out in the center for several inches, and the stave or built-up column. The latter, after many tests, has proven to be the most satisfactory, as the constant contact with the elements causes checking and cracking where there has been a disregard for care in the manufacture of the work.

In boring out the columns from the solid log there is sure to be left some of the sap wood and this, when it dries out, will cause damage to the columns. The built-up column obviates this danger, and likewise makes the column much more durable. So it will be well to make sure of the kind of column that is placed in pergola work in order to obviate the danger of damage. There is another advantage that the built-up column has that is well to keep in mind. In placing the columns in position for the pergola the better plan is to first erect a post, at least 3 ft. in the ground, and permitting about 18 in. to remain above the surface, over and to which the columns can be placed and fastened, making the latter very secure in time of storm or wind. The posts are of cedar, chestnut or locust.

Pergolas and the Contracting Builder—The Artistic Effects of a Well-Placed Pergola

The style of the column is also an important factor. In ordering one should never request a "Colonial" column, for this is a misnomer. There are a half dozen styles, and the particular style should be studied with care before ordering it.

Pergola with the Central Section Covered with Circular Roof

Imposing Effect of Pergola in Grounds of a Country Home

The most popular columns for pergola work are the Doric and Ionic, either plain or fluted. The square and octagon styles are not so generally used for this class of work as the round columns owing to the fact that the latter seem to fit in with the general scheme of decoration more artistically.

The pilasters, caps and bases also demand attention from the builder. The size of the column should be definite, and the same applies to the other sections of the work. To make this clear to the manufacturer these points should be kept in mind: Quality of columns, size at largest and smallest diameter of shaft, and length over all. Be sure to state that they are for pergola work. Pilasters should be ordered so as to match the columns. The dimensions of the top and bottom of the shaft should be given and it should be made clear whether the width is to equal the largest or smallest diameter of the column; whether they are to have the mean diameter of the column shaft, and if they are to have the same taper as the columns. These details are vital, and make the matter clear to the manufacturer.

Where the columns are to be used for exterior work they are treated in advance by the manufacturers, and there will be no danger in this respect. It is a very important matter for the contractor to keep these details in hand when he assumes to undertake this character of work. The erection of the pergola is a simple matter if there has been care in the first place in securing the proper dimension stuff. The width of the columns and the location of them is a matter for individual taste. It might be well to bear in mind the following rule, so that the style of columns used will be correct as to hight: The Greek-Doric column should be seven times the bottom of the shaft, the Tuscan eight, and the Roman-Doric nine times. The diameter at the neck should be one-sixth less than the bottom diameter. The measurement for the hight is taken from the bottom of the base to the top of the capital. The caps used for pergola work are generally plain, though it is not a rule to be followed. Then the manufacturer should be informed what the columns are for so that in the case of pergola work the capitals are furnished with solid abacii, this is to prevent the weather doing damage, as will be the case where the mitered abacus is used.

While there are other materials used for pergola work, such as concrete, stone, brick and terra cotta, the larger number are constructed of wood, and can be more readily adapted by the carpenter-contractor. The character of the work is a matter of simplicity itself if there has been care taken in ordering the materials. The dimensions of the space to be occupied by the pergola must be kept in mind. The peculiar curves or angles should be noted and all these details made clear to the manufacturer

The idea of the pergola is to afford a shelter from the sun and to act as a garden nook or other retreat. These shelters sometimes lead directly from the porch to the garden, the garage or the indoor garden. They are built along different lines and they are a feature of the home, not alone the mansion in the country, but also the more modern abode in the city and suburbs. They are found in the small city and in the towns. They are increasing in popularity for the reason that there is a growing desire to live in the open. They serve as a retreat and they deserve justly the popularity that is now being accorded them.

A Graceful But Less Imposing Design of Pergola

The illustrations accompanying this article are from photographs kindly loaned by the American Column Co., Battle Creek, Mich., and the Hartmann-Sanders Co., Chicago, Ill.

Frame Cottage with Cobblestone Porch

A Dwelling in Which the Compact Arrangement of the City Apartment Is Secured at No Sacrifice of Light and Air

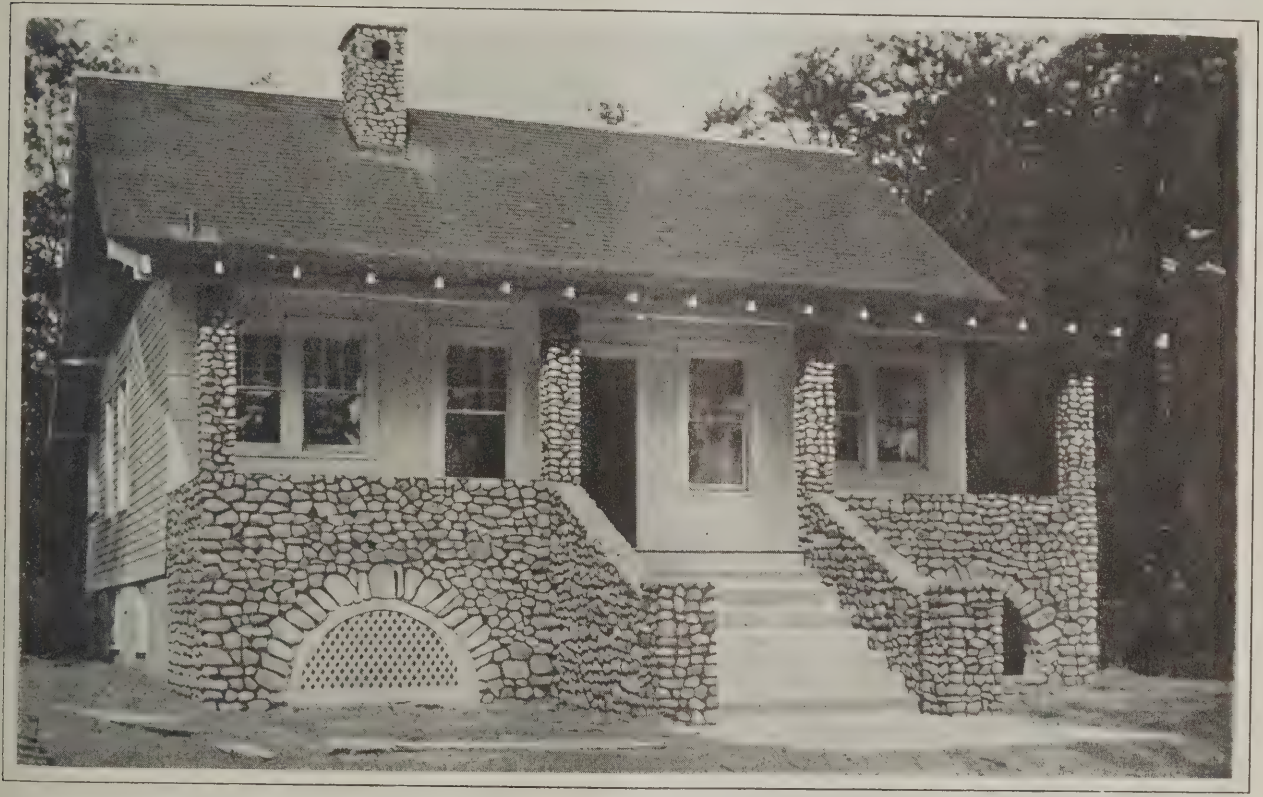
FIELD stones suitable for building purposes are found in many sections of the United States and in some cases, notably in New England and the Middle Atlantic States, the owner of a residence lot frequently finds sufficient material of this kind for his purpose on the property itself. In the cottage here described, which is located on Staten Island, N. Y., the architect employed these stones to good advantage in the construction of the porch walls and columns, as well as for the exterior of the chimney. In the construction of this rubble stone work it is necessary that the wall be well bonded together by lapping the stones over one another in such a manner as to leave no long continuous joints in the masonry, either laterally or longitudinally. A bonding stone should be used every 3 or 4 ft. in each course, extending through the thickness of the wall.

A touch of the bungalow style of architecture is found in the long roof line with wide overhang at gables and eaves, and the exposed rafters.

Five cement steps lead to the porch floor level, from which the main entrance door leads directly into the living room. The latter is 13 ft. 6 in. x 15 ft. 3 in., is lighted by a window on each side of the front door, and is provided with a fireplace. The latter, shown in the accompanying cut, is constructed of brick manufactured by the "Little Gem" brick machine, which machine is part of the equipment of the builder.

The chimney is placed so that the pipe from the kitchen range may be run directly into the flue, and the warmth from the chimney will render assistance in the heating of the bathroom.

The latter is entered from the living room and is lighted by a mullion window upon the porch. It is equipped with a 5-ft. roll-rim bathtub, a lavatory, and a syphon-jet closet. A large toilet cabinet is installed at the left of the lavatory.



A Frame Cottage with Cobblestone Porch—Architect Charles B. Keffer, Tottenville, N. Y.

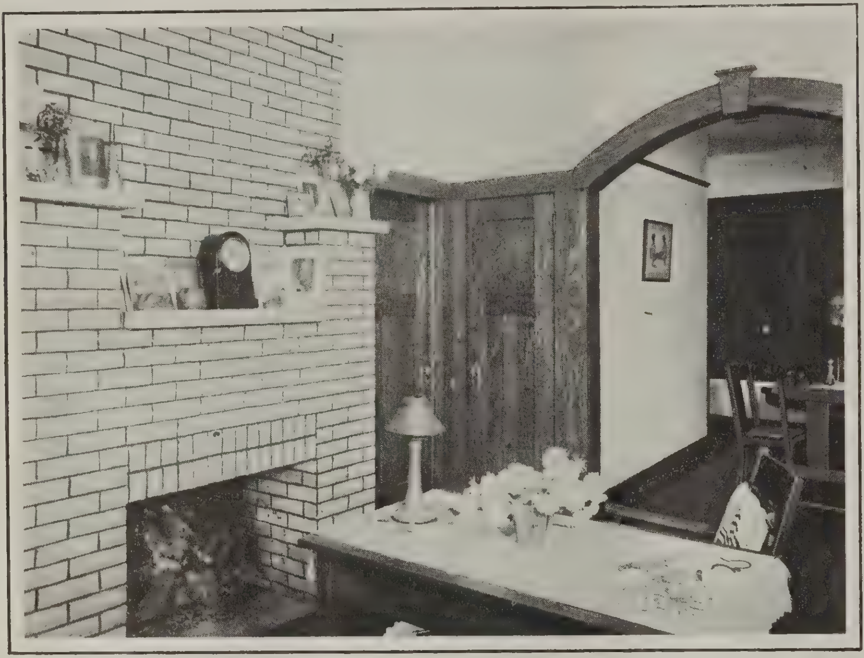
Each of the two bedrooms is entered from the living room, and each is lighted by mullion windows in the two outside walls.

A wide doorway connects the living room with the dining room, which is well lighted by triple mullion windows in the rear wall.

The kitchen, which is also entered from the living room, is lighted by two windows in the side wall. The equipment includes a white enameled sink, 18 x 32 in.; a No. 25 Astor range, made by the Union Stove Works, to which is connected a 30-gal. boiler; and two wash trays.

A staircase leads from the living room to the basement, and another, in the kitchen, leads to the single room in the upper story. The latter is well lighted by a window in each side wall, and by the large dormer at the rear.

The cellar is excavated to a depth of 6 ft. 3 in. and the excavation for the piers extended to a depth of 4 ft. below grade. The foundation wall below grade is made of 8 x 12 x 16-in. plain concrete blocks; and the wall above grade of 8 x 8 x 16-in. rock-faced blocks. The foundation rests on a footing of concrete 8 x 20 in. in dimensions. All cement blocks are laid in cement mortar composed of three parts sharp sand and one part Portland cement.



A Frame Cottage with Cobblestone Porch—A Glimpse of the Living Room with the Dining Room Seen at the Right

The cellar floor is laid with a concrete mixture composed of one part Portland cement and five parts cinders, with a top dressing composed of one part Portland cement and three parts sharp sand.

The chimney foundation extends to a point 4 ft. below grade and is of concrete composed of one part Portland cement, one part sand, one part broken stone, and three parts cinders. The chimney above grade and to floor level is made of large stones filled with cement mortar, and where exposed to view from the outside is built of field stones.

The fireplace is provided with a damper and smoke box above the opening.

All timbers, including sills, corner posts, headers and girders, are of spruce.

The rafters are notched at the plates, and the studs and headers are doubled on the corners and around windows and doors. All studs and floor beams are set 16 in. on centers. Joists are sized and laid crown side up. Rafters are covered with 1 x 2-in. spruce lath placed to support red cedar shingles laid 5¼ in. to the weather. All rafters are exposed.

The girders are 6 x 8 in., floor beams 2 x 8 in., sills 3 x 6 in., rafters 2 x 4 in., corner posts 4 x 6 in. and the studs 2 x 4 in.

The sheathing is of 1 x 10-in. No. 2 common roofing boards.

The exterior side walls at gables are shingled, and the remainder of the exterior wall area is covered with ⅞ x 10-in. pine siding. The corners are finished by lapping over the boards, no corner boards being used.

Two coats of plaster are applied on lathed walls, ceilings and chimney surfaces, the first coat consisting of King's dry mortar, upon which is applied a hard finish of lime and plaster-of-Paris.

Between the sheathing and the siding was placed a layer of red rosin-sized building paper with a lap of 6 in. The rough flooring of the first floor is of 1 x 8-in. N. C. pine over which is a finished floor of 1 x 2½-in. comb-grained matched stock.

All doors are of chestnut. The design of the entrance door is shown in the detail presented herewith. All other doors are of the same design, except in the case of the top panel, which is solid.

All outside woodwork, except shingles and doors, is painted with two coats of Atlantic Lead Co.'s white lead and linseed oil. All interior woodwork is filled with paste wood filler, over which is applied two coats of finish.

This cottage was erected for Charles S. Wagner, at Tottenville, Staten Island, N. Y., by Christian O. Petersen, 222 Wood Avenue, Tottenville, N. Y., from plans prepared by Charles B. Keffer, in charge of the architectural department of the builder.

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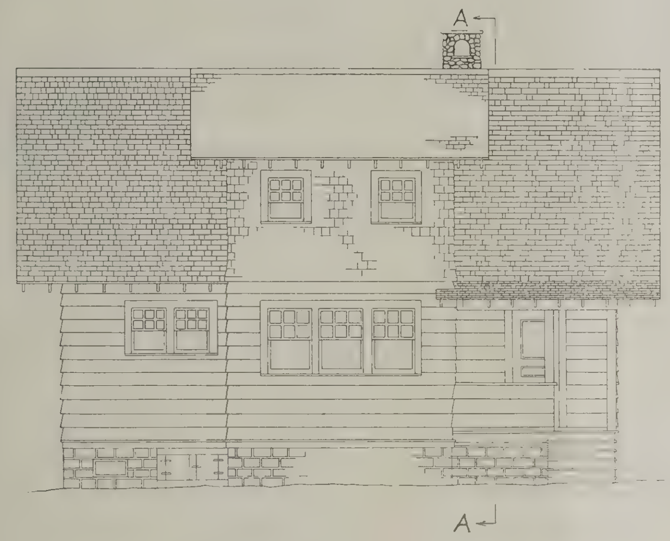
Building in Afghanistan

Most of the ordinary houses of Afghanistan are constructed of sun baked mud bricks. The ordinary building method is to fix firmly in the ground some poles, on which a complete wooden skeleton of walls, doorways, ceilings and roof screens is formed. The wall interstices are then filled with sun baked mud bricks. Upon the poles placed as rafters long rush mats are spread, and over them about six inches of mud is smoothly laid, forming a roof, into which sundry bits of hollowed wood are fixed by way of rain spouts. The walls, both inside and out, are carefully plastered down, chopped wheat straw being added to the mud, just as hair is used in England.

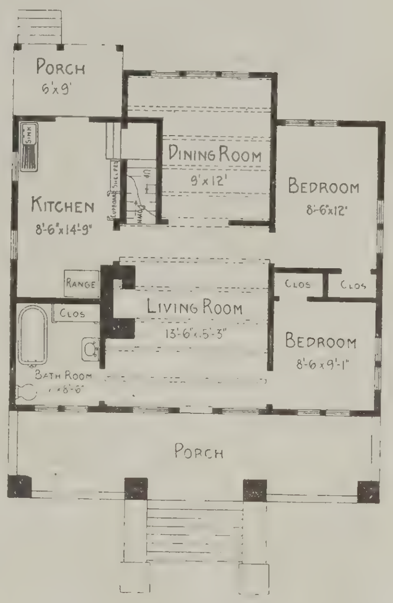
A rudely carved window frame, holding five sliding shutters, in which are two or three panes of precious glass from India, is inserted in the upper story. Afghan doors are crudely made in two divisions, or flaps, which are fastened by being cautiously brought together and hooked to a staple in the door frame above by a piece of chain. Metal hinges are rare, but spikes of wood left jutting out of the doors at their inner corners, top and bottom, and stuck into holes and act as swivels. In walls of all dwelling rooms mud shelves are made. One runs around three sides of the room about 7 ft. from the floor, like a massive frieze, and beneath it is a series of arched recesses, forming many smaller shelves, about 30 in. long by 5 in. wide.

The heating arrangements of Afghanistan houses are rather primitive and hardly sufficient to provide comfortable warmth during the cold winters which prevail, especially at Kabul, 6700 ft. above sea level, and other more elevated districts, says Consul Henry D. Baker on special service in India. The chief method of heating is by charcoal braziers, known as sandalis. An iron pot or brazier is placed in the middle of the room and filled with glowing charcoal. Among poor people simply a shallow hole is scraped in the earth of the floor, and in this the charcoal is put. A large wooden stool is placed over the charcoal and covered by a very large cotton wool quilt, or rezai. The people sit on the ground around the sandalis, pulling the quilt up to their chins. A big "postin" over the shoulders keeps the back warm, and the turban is always kept on the head. In the winter little work is done, and people sit by the sandalis most of the day.

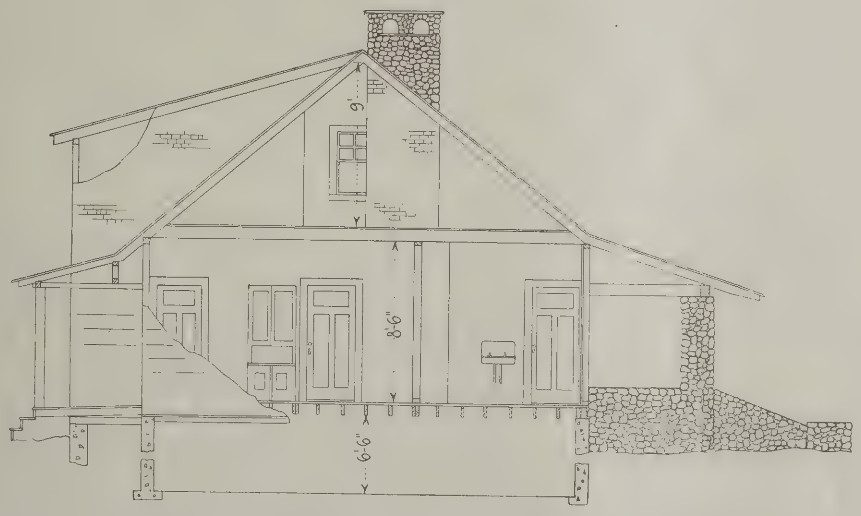
All the larger houses have rooms for the Afghan bath, somewhat like a Turkish bath, except that the heat is not so great. The walls are cemented and the floor either cemented or paved with an inferior marble that is plentiful near Kabul. The cement is made of equal parts of wood ashes and lime moistened and beaten together for some days. In a recess in one wall is a cistern or tank of stone or cement, with a fireplace beneath it, which is fed from the stokehole outside the bathroom. Public bathrooms are quite an institution in Afghanistan. They are rented by a bathman or barber, who makes what he can out of them. Some of the bathhouses belong to the Amir. It is probable that with the completion of the hydroelectric enterprise there will be a demand for the equipment of the better class of residences at Kabul with electrical stoves and other heating appliances.



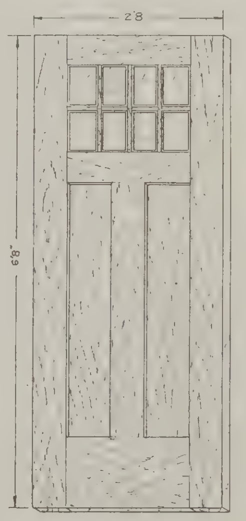
Rear Elevation—Scale 3/32 In. to the Foot



Main Floor Plan—Scale 1/16 In. to the Foot



Vertical Cross Section Taken on Line A-A of the Front Elevation—Scale 3/32 In. to the Foot



Detail of Front of Door—Scale ¾ In. to the Foot

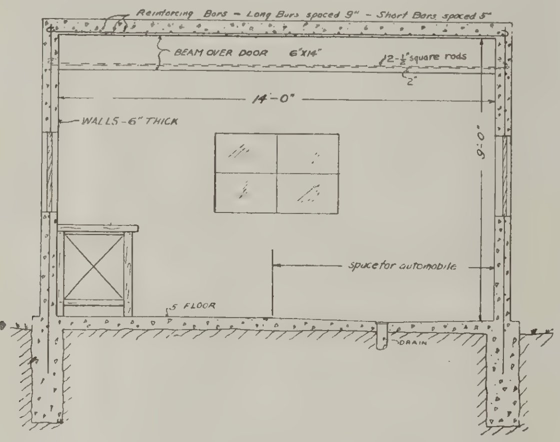
A Frame Cottage with Cobblestone Porch—Elevations, Plan and Detail

Building Small Fireproof Garages

A Form of Construction Well Suited to the Purpose —Some Details Indicating Method of Construction

By Percy H. Wilson

To keep the automobile safely and in the most efficient order and to preserve its appearance, there should be provided a permanent, fireproof garage. Concrete is the most suitable material for this purpose. A concrete building is warm in winter and cool in summer—very important considerations for the motorist who likes to "tinker" on his machine—and its fireproof qualities are self-evident and of the utmost importance where gasoline is so freely used.



Vertical Cross Section of Garage Showing Construction

The garage should not be planned of too small dimensions. It is desirable to provide space for a work bench fitted with a good machinist's vise and rack for tools, and allowance made for room to store oil, gasoline, extra tires and other supplies. For a single car a size of 18 ft. long by 14 ft. wide by 9 ft. high (inside measurements) will be ample.

The foundations should be 12 in. wide by 3 ft. deep and should extend 5 in. above ground level to provide for a concrete floor of this thickness. The concrete for the foundation should be made in the proportion of 1 part Portland cement to $2\frac{1}{2}$ parts sand to 5 parts screened gravel or crushed rock. Upon the foundations the 6-in. wall will be placed. Make the walls of 1 to 2 to 4 concrete. The walls are reinforced with $\frac{3}{8}$-in. round steel rods, spaced 14 in. apart, and running both horizontally and vertically. The forms for the walls can be built the full height, or movable forms of a height of about 3 ft. can be used. Forms made of 1-in. siding, well supported by 2 x 4 lumber to prevent bulging when concrete is placed. The movable forms are filled and raised each day until the entire 9 ft. is completed. In order that the car can be easily run in and out of the garage, it is well to leave the entire entrance side open and fitted with large swinging doors. In the sides of the doorway embed bolts with heads in the concrete. These bolts will be used later for fastening the wooden door jamb which carries the hinges for the doors.

The concrete floor will be 5 in. thick, made of 1 to $2\frac{1}{2}$ to 5 concrete, and rests directly on the ground. The ground should be scraped and well rolled or tamped to secure a good foundation for the floor, which is laid after the walls are finished. Where the car will stand the floor should be sloped to a drain at the center to carry off the water used in washing. If running water is obtainable the pipes should be laid before the foundation and floor are started. It is a good plan to provide for an underground gasoline storage tank with a pump extending up through the concrete floor.

The roof can be made either peaked or flat. The flat form is much easier for the average person to build. Such a roof should be constructed with a slope of about 4 in. toward the back of the building to drain off water. Make the roof 6 inches thick, of 1:2:4 concrete, and reinforced with $\frac{3}{8}$-in. round steel rods spaced 5 in. apart for the short lengths and 9 in. for the long lengths. These rods are located 1 in. from the bottom of the roof. Where the rods cross, wire them together to prevent shifting when the concrete is placed. Over the doorway, where there is no wall to support the roof, the weight is carried by a concrete beam 6 in. wide by 14 in. deep, including the thickness of the roof. Both beam and roof are built at the same time. Two inches from the bottom of the beam place two $\frac{1}{2}$-in. square twisted steel rods. The form for the roof consists of a flat platform of 1-in. boards on joists supported by upright studding. Be sure that the forms are strongly made and well supported so as to safely hold the weight of the wet concrete. This form should remain in place for a week or two after placing the concrete.

A Front View of the Completed Garage

Make provision through the roof for a concrete chimney or sheet iron smoke pipe for a small stove.

The Quantity System of Estimating

Method of Estimating for Building Contractors as Practised in England—Some Comments of Special Interest

By G. Metson*

AT the present time no large building contract in England would be entered into, unless quantities were provided. At one time builders putting in bids took off their own quantities, for the position of quantity surveyor was unknown, but with the advent of the system of competitive estimating, which is now the almost universal one employed, quantities had to be taken off to be issued to those desirous of bidding, as it was impossible to let all the contractors see the plans or contract drawings at one time. At first the person taking off the quantities was employed or appointed by the competing contractors among themselves, but this system lent itself to collusion, so that it ended by the architect appointing the quantity surveyor, and that is the position at the present time.

The Bill of Quantities

The bill of quantities is, as far as possible, a correct list of the quantities of labor and materials or works necessary to carry out the construction as shown upon the plans and other drawings prepared by the architect. These quantities are entered into a form in which they are left, as a general rule, in the denomination in which it is easiest for the contractor to figure, the columns being headed yards, feet, tons, etc., just as the case may be. After these columns comes the descriptive one in which is entered a brief, yet accurate, description of the work to which the quantities refer. Then follows a rate column in which the contractor enters his price to execute that particular item of work at per unit of work; and the last three columns are the ones to which the contractor extends the price for the work described for the full quantities entered in the previous columns. The price for the whole of the work shown on the drawings is reached by the addition of these last three columns and constitutes the amount of the bid.

Prices Strictly Competitive

As each contractor has had exactly the same information, the prices become strictly competitive, and it is noticeable among the best class of contractors that the differences between the amounts of their bids are on large works very small, these being generally traceable to peculiar facilities for executing certain parts of the work, as plant standing idle, against other firms having to buy, facilities for transportation, stocks on hand, etc.

The quantities may or may not form part of the contract; in fact, whether they do so or not depends on the nature of the contract, but as a means of giving to contractors, identical information so that they all stand on the same footing when bidding quantities are generally issued and some firms will refuse to tender if they are not supplied.

When only a lump-sum-price contract is required, the specifications and plans, etc., show all the work involved. If quantities are issued in this instance it is only that all contractors competing can estimate on the same basis.

If, however, the lump-sum-price contract provides for alterations; that is, variations on the drawings originally furnished, then the bills of quantities become necessary as part of the contract, as it can be stipulated that the additions or omissions are to be priced at the unit rates for the work described or entered in the bills of quantities, which last practically becomes a schedule to apply.

A Third Kind of Contract

A third kind of contract is that in which, although plans, specification and bills of quantities are provided and all form part of the contract documents, the whole of the work executed is measured up at completion and prices at the unit rates entered by the contractor in the bills of quantities. In this case the bills of quantities produce tender prices for comparison only in determining who is to be the successful bidder.

It is, however, conceivable that works in the first two kinds of contract may be executed for which no descriptions, either of labor only, or labor and materials, have been given in the contract bills of quantities, and which will consequently have to be executed as "time and material." To meet this contingency a "schedule of rates of labor in day work" is generally made a fourth contract document, the materials being prices from receipted accounts produced by the contractor, or from a further "schedule of prices for materials in day work."

In the third class of contract it is as well if the quantity surveyor, who originally took off the quantities, acts on one side, either for the building-owner or the contractor, as he will know the system upon which they were taken.

The bills of quantities are prepared by men who have made a specialty of this class of work and who are termed "Quantity Surveyors."

Qualifications of Quantity Surveyors

In addition to having a sound knowledge of practical construction, the quantity surveyor must be well versed in current prices of materials and in the quantities of materials required to execute a certain amount of work, so as to be able to readily deduce a price for work not exactly in agreement with the wording of the description given in the original quantities. This will be imperative when dealing with day-work accounts, for it is very often found that the amounts of materials entered on contractors' day-sheets bear no semblance of proportion to the time charged or vice versa. This knowledge is also essential when the contract provides for the valuation of executed work, differing slightly from that described in the original bills of quantities to be made at rates proportionate to the prices appended in the bills, and this is included as a clause in one form of contract issued by the Royal Institute of British Architects.

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*Lic. Royal Institute of British Architects. Lecturer on Quantity Surveying at the Borough Polytechnic Institute, London, Eng.

The position then of a Quantity Surveyor is one of importance and of trust, as the builder relies upon the quantities as provided as being accurate and containing truthful measurements and descriptions of the work to be executed. The architect bears the responsibility of selecting the quantity surveyor and relies upon him in the same way as does the builder; and both together with the building-owner rely upon him adjusting the variations impartially—the builder that he is paid for all he has provided, while the building-owner expects him to see that he has credit for every deduction, and is only charged for that actually executed.

Advantages to Owner and Builder

The advantages of providing quantities are manifest, both to building-owner and builder alike. The building-owner knows exactly what he is going to be called upon to expend before he pays out a penny, and where variations are necessary, a very close, if not exact, estimate of the cost of such can be obtained by the architect (or the quantity surveyor) preparing an estimate of the cost from the appended prices in the priced bills, though whether this is a wise practice is open to comment.

He can, by keeping a careful check or watch on the items in the bills of quantities, perceive quite early if an item has been under-measured, so that he can call attention to the shortage, and obtain the necessary written order for the "extra."

Incidentally it might be mentioned that some builders provide their foreman with unpriced copies of the bills of quantities, in order that they in their turn may watch for under-measured items, and also to act as a check upon their own orders for materials before sending them to the builder's office. It is a fallacy and a slur upon a painstaking class of men to say that where blank bills of quantities are issued to foremen, that they order directly from them, instead of merely checking their orders from them, though this is an excuse often given by builders for not providing them.

The system followed in taking off quantities is not universal in Great Britain, as that followed in Manchester, Glasgow and other large towns differs in some respects from that followed in London, but the differences are of no great moment. In some cases they are a necessity on account of the different system of estimating prevailing in various parts of the country; for whereas in London and the Southern countries it is usual to have only one contractor for the several trades, in the Northern countries it is quite common to have separate contractors for each trade or each class of trades—one taking, say, the excavation, concrete, brickwork and masonry, another the plumbing, glazing and painting and so on.

Accuracy Essential to the Contractor

No matter what system is followed, it is essential that the information given to the contractor in the bill be implicit, yet concise in description, with the work so measured that the estimator can readily price them, and at the same time such that the priced items form a schedule at which to price work in detail. For example, it is not quantity surveying to amalgamate, say, digging to foundation trenches, including planking and strutting and concrete, all in one item, as this would mean the contractor giving a unit price for all three items as one; but the digging, the planking and strutting and the concrete must all be measured and entered in the bill separately, so as to give a unit price for each of them. In the case of quantities prepared on this incorrect method, how is the surveyor to know what price to allow for the several operations?

Several Men Necessary on Large Jobs

It will readily be seen that it will not be possible on a large job for one man to take off the whole of the quantities, as such a procedure would cause a long time to elapse between the date of the completion of the contract drawings and the date upon which bids could be asked for on the quantities provided; so an "order of taking off" has to be maintained under several sub-headings, so that one taker-off, A, knows exactly what another taker-off, B, will take off under one sub-heading, with the result that *B* can be taking off work, say, under "Roofs," while *A* is dealing with "Floors," and so on, and so the whole of the measurements of the several works even on a large job can be taken off by a few skilled quantity surveyors in quite a short space of time.

The most common practice in London is to divide the work into two main headings, "Shell of Building" and "Finishings," each having sub-headings under them, and it is incumbent upon each surveyor knowing the items in each one, so as to avoid duplication. This knowledge of "the order of taking off" is soon acquired.

A knowledge of quantity surveying is now recognized in England as an essential qualification for architect's assistants, clerks of works and foremen, not that any one of them should ever at any time act professionally as a quantity surveyor, for that is best left to men who make it their especial profession, but that they may make the best use of such bills of quantities as come their way in the course of their ordinary duties.

The Matter of "Extras"

With quantities forming part of a contract as previously mentioned—and this is the most common form of contract in London—the builder and his foreman, if they understand quantities, know at once when an "extra" is being asked for, as they do not rely upon an oftentimes badly worded specification and none-too-clear drawings; nor can the architect impose upon them, by furnishing full size details of work differing from that intended or shown on the smaller scale contract drawings.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

A Carpenter's and Builder's Workshop

From J. P. Wells, Lane, Kan.—I am sending two pictures of my shop showing where I get out all my mill work except doors and window sash, which, however, I often make for builders in other towns as well as do mill work for them. I send this matter thinking that possibly some of the readers of *The Building Age* may be interested in it.

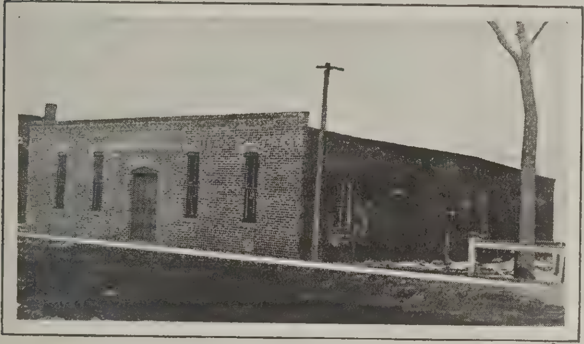


Fig. 1—A General View of the Workshop

My shop measures 41 x 50 ft., but this is too small to be fully equipped with all the machines I could use and still leave room to work with a carload of lumber lying around. I have had as much as 20,000 ft. of lumber in it at one time. The interior view which I am sending does not show half the shop, but it does disclose a pile of molded baseboards on the saw benches and rabbeted door jambs at the left.

The equipment of my shop consists of a six horse power gas engine, a 12-in. jointer made by the Crescent Machine Company, a mortiser of the Seneca Falls Mfg. Company's make, a sander and boring machine, a turning lathe and a combination saw table. The mandrel of my sawing machine I secured from the Hall & Brown Woodworking Machinery Company, and it is provided with long arbor so I can use wide cutters on it when desired. I also use Huther Brothers patent groover or dado head.

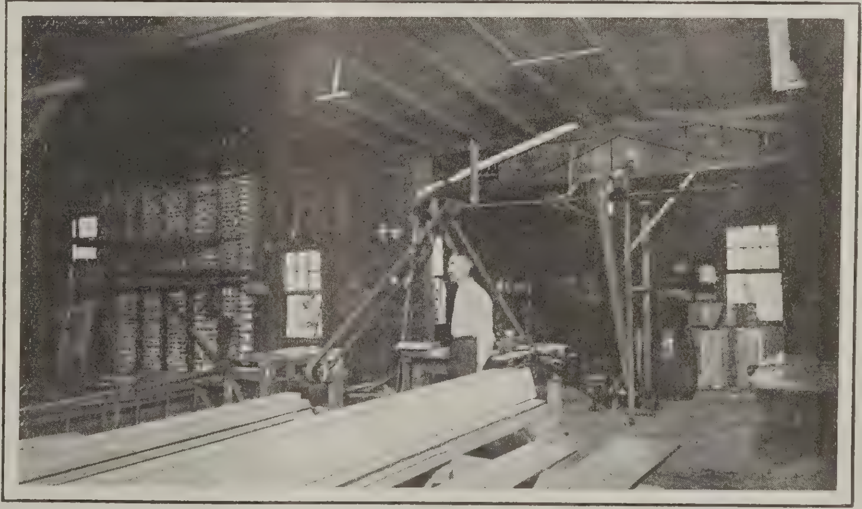


Fig. 2—An Interior View Showing Some of the Equipment

Carpenter's and Builder's Workshop of J. P. Wells, at Lane, Kans.

I made the table myself with solid frame of 4 x 4 in. white oak. The walnut top is made to raise or lower and can be held securely at any point. The fence or guide is adjustable to any desired angle for bevel ripping, and I have cut off guides for square or any other desired angle. I can groove or gain straight or angling from 1/16 in. to 2 in. wide and any desired depth. I can also cut dovetails.

The reader may think this is not much of a machine, but for real work it is a "dandy." I have ripped Osage-orange or hedge 5 in. thick.

The sanding and boring machine is of my own construction and is seen at my left in the photograph. I turned two wheels of 10 in. diameter and 3 in. thick, the split wheels being clamped on a 1⅜ in. shaft. I covered the wheels with 1 x 1½ in. staves fastened with 2-in. screws, then started the drum running about 700 revolutions per minute and turned it true on the shaft.

I covered the drum with heavy Brussels carpet and it was ready for the sand or garnet paper. I left out one stave so as to secure the paper on the drum, putting the paper around the drum straight and tight with the ends in the slot; then screwed down the stave which had been left out, and it was ready for business. One end of the shaft has tight and loose pulley and the other end has a hole ½ by 2 in. deep that fits mill bits or common brace chucks so I can use almost any kind of a bit. I have an adjustable table on that side to hold the stock while boring. This does not show in the photograph.

The sand drum comes in very handy and saves a lot of work, while the boring machine is "great" when it comes to mortising window jambs for the pulleys. One punch, four holes at once, and it is done, and it fits.

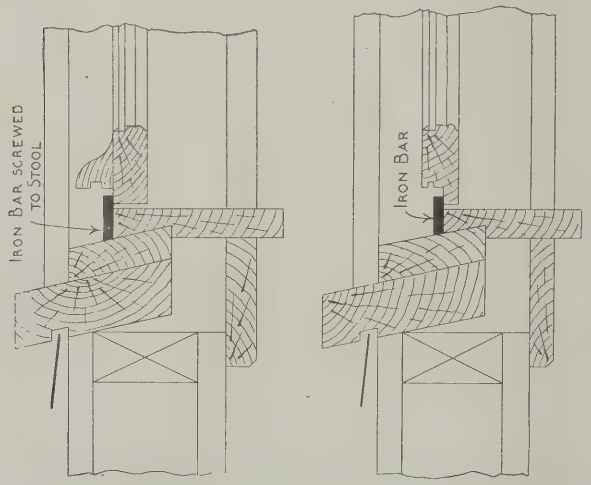
My lathe is also of my own make, and with it I can turn up to 10 in. in diameter and 10 ft. in length. I have an emery stone for grinding and

and I also make use of carborundum wheels.

A shaper head which I think beats any turned out by the big factories is cylinder-shaped 3½ in. in diameter and 3½ in. long, the last dimension, of course, standing perpendicular. There are two slots in the heads for the cutters, 5/16 x 2 in. and ⅞ in. between them. The holes, which extend from the top of the head down the center of each slot, are threaded and fitted with set screws to secure the cutters. The bottom edge of the cutters is grained out about ⅛ in deep, forming a shoulder on both ends of the cutters to fit down over the sides of the head so the cutters cannot come out when the set screws are turned down on top of the cutters. There is no springing of the head, as is the case with some of the old style heads when one cutter is wider than the other.

Construction of Casement Windows

From E. B., Vancouver, B. C.—I am sure if the correspondent, John Wavrek, Jr., follows carefully the columns of your valuable paper each month he will find many satisfactory details of casement windows. I think the article and drawings on page 169 of the April issue of *The Building Age* for 1913 meet the difficulties of casements.



Construction of Casement Windows

If your space will permit I desire to submit two methods which have not yet been mentioned, designed to meet the very faulty construction shown in the December issue and which I have found to work satisfactorily. These methods are illustrated in the accompanying sketches which represent vertical cross-sections through the window sill and sash.

I do not like the system of slots for draining, as they become quickly filled with dirt.

Framing a Conical Tower

From W. S. W., Pleasant Ridge, O.—In answer to the inquiry of "J. W.," Victoria, B. C., which appeared on page 470 of the October issue of *The Building Age*, I am sending a drawing which will show him how to develop the lengths, cuts, etc., for a conical roof on top of a hip roof. The following description taken in connection with the drawing will I trust serve his purpose:

First lay out the plan of the hip roof and the plan of the rafters for the conical roof, using as many rafters as may seem desirable. The correspondent will see that I have used 16, making one come over each hip rafter, one over each common rafter and one between each of these.

Next lay out the elevation of the hip and the conical roof. I have used 45 degrees for the hip and 60 degrees for the conical roof, but they may be of any pitch or of any size. I always aim to give a method that will work on any roof of that kind I might wish to build. The lengths and bevels may be found with less lines than I have used, but I have made my diagram so the correspondent will see the reason for each line and how to find it.

Referring to the drawing, extend one rafter of each length until it strikes the plate line, as at *o-a*, *o-b* and *o-c*; then turn these lengths over on the line *o-g*; then *o′-c′*, *o′-b′* and *o′-a′* will give the true slope of the hip roof under each one of the conical rafters and the line *o″-d-e-f* gives the length of each of the conical rafters. In this roof there are only three different lengths. The foot cut for the short conical rafter is shown at *o″-d-o′*, this being the one that is over the hip rafter of the hip roof; the bevel for the other two are given by *o″-e-o′* and *o″-f-o′*.

Drop perpendiculars from *d*, *e* and *f* to the line *o-g* and then strike circles which will give the plan length of each rafter, as at *f′ e′* and *d′*. This will give the plan of the conical roof.

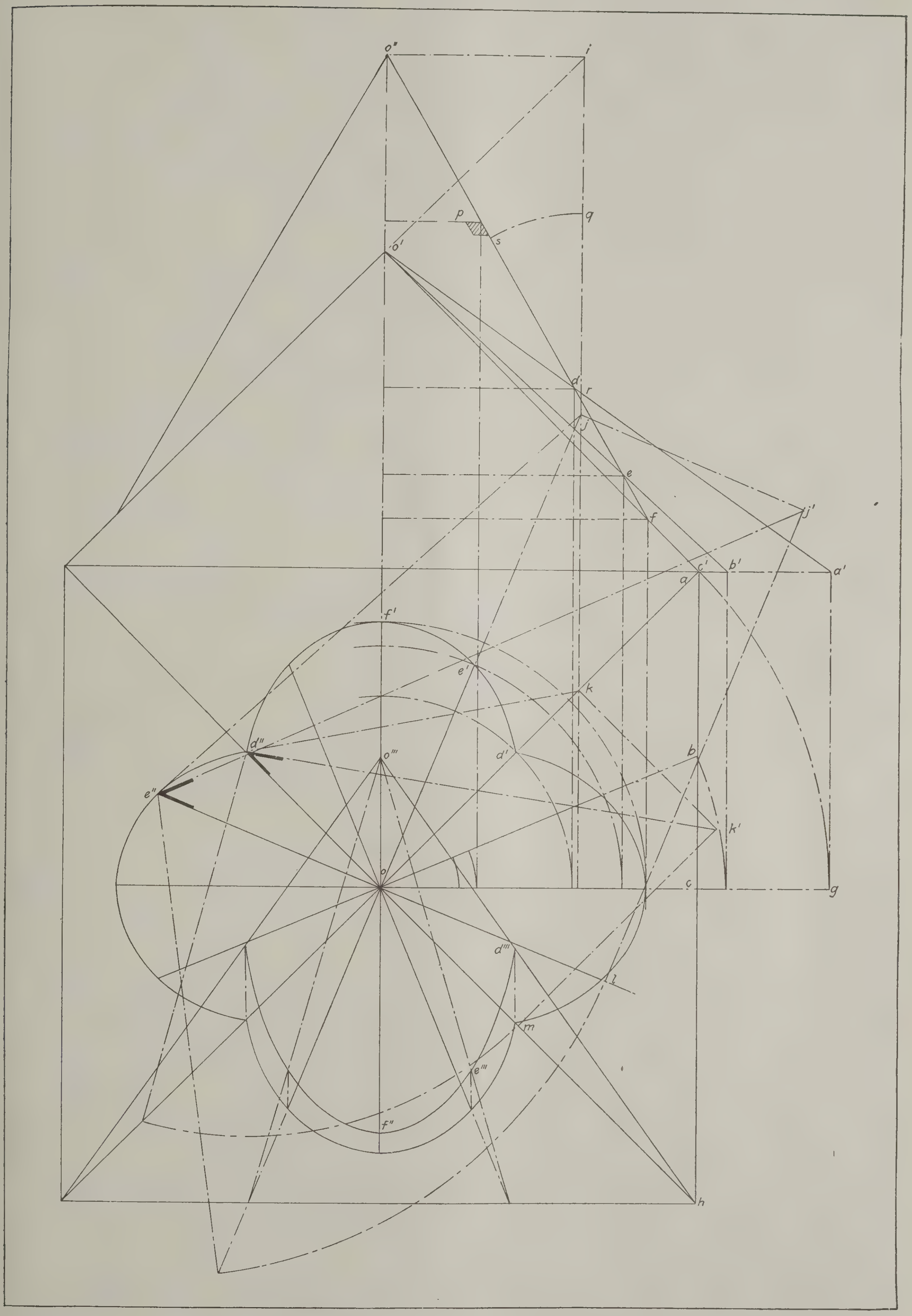
Each of the rafters *o″-d* and *o″-e* have a side bevel, which is found by extending the line *h-o′* to *i* level with *o″*; then drop a perpendicular and draw a line at right angles to the plan of the rafter, *o-e″*, until it strikes this perpendicular at *j*, which gives the plan bevel at *o-e″-j*. In order, however, to get the true bevel use the true length, *o″-e*, from *e″* to *l*. Draw the line *l-j′*, which will give the true bevel at *e″*.

To find the bevel for the rafter *o″-d* use the same method, the points being *d″*, *k*, *k′* and *m*, then *d″* will be the true bevel. This rafter will bevel both ways from the center, for it sets on the hip.

To make a template to lay on the hip roof to mark the place where each rafter should set lay out the true length of the hip rafters, as at *o‴-n*, which gives the true shape of one side of the hip roof. Lay off the true length, *o′-d*, as at *o‴-d‴* and *o′-e* at *o‴-e‴* and *o′-f* at *o‴-f‴*, which will give the true shape that the conical roof will cover, also each point where a rafter will set.

The correspondent will see that I have shown a section of a purlin at *p*, which can be made by taking the radius from the plan, lay it off on a board and tilt the band saw table to include *q-r-s*, which in this case is 30 degrees, and saw to the lines; get the length and bevel from the plan.

I do not quite understand what the correspondent means when he speaks of "plates." I should think the best way would be to set the rafters directly on the sheathing, but if I have misunderstood him in any way he can ask another question and I will see what I can do. If he will look in the issue of *The Building Age* for May, 1913, page 233, he will there find a drawing of a conical roof which might help him on some points. He will notice that I have shown another kind of purlin there which he might like better.

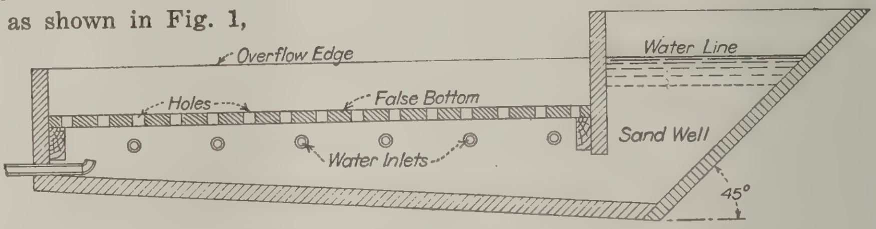


Framing a Conical Tower—Sketch Accompanying Letter of "W. S. W.," Pleasant Ridge, Ohio

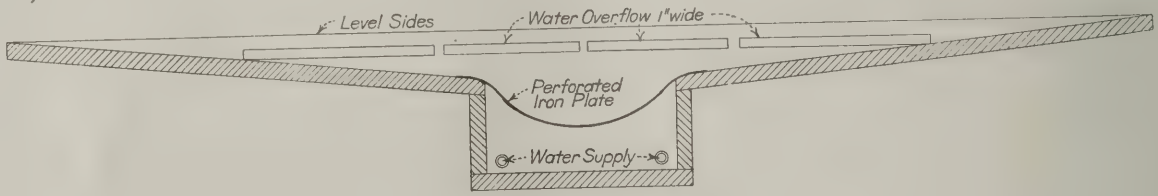
Washing Crushed Stone for Concrete Work

From Ernest McCullough, Chicago, Ill.—In reply to "E. G. C.," Atchison, Kan., I wish to say that I have had occasion a number of times to wash sand and stone for concrete work when a mixer was too slow and costly. One method is to use a platform several feet long sloping not to exceed 6 in. in 10 ft. Have the sides and ends with the top on a level, the hight of the upper end being about 8 in., which makes the lower end about 14 in. high, with the sides varying from 14 in. at the lower end to 8 in. at the upper end. Shovel the materials in at the upper end and play a hose with a strong stream against the face of the material. This will cause it to flow down the slope, for considerable water must be used, and the dirt rises with the water and is carried over the level edges of the box. The cleaned material is shoveled out at the lower end, a regular coal scoop being the best form of shovel to use.

Another form of sand washer is made of a box having sides about 18 in. deep, a false bottom being but in the box about 6 in. from the bottom at the high end. This false bottom is fastened in place so it may be removed when necessary. It is filled with holes about ¾ in. in diameter. One end of the box terminates in a well as shown in Fig. 1, about 2 ft. deep, and the bottom slopes about 2 in. per foot towards this well, but the false bottom is perfectly level. Water is introduced into the space below the false bottom at several points, so it will rise through the holes in the bottom and flow over the sides. The sand is thrown into the box with a scattering motion, to fairly well distribute it. It sinks through the false bottom, against the rising water, and is thus washed. A bucket pump is placed in the well to scoop up the cleaned sand as it flows down that way, the additional hight of the well walls not permitting the water to rise there to any greater hight than the top of the side walls of the box. Such a washer can be used for stone if the holes in the false bottom are large enough. With some experience the operator can regulate the water pressure so the results will be very satisfactory.



Longitudinal Section Through Sand Washer—Scale ½ In. to the Foot



Longitudinal Section Through Stone Washer—Scale ½ In. to the Foot

Washing Crushed Stone for Concrete Work—Sketches Accompanying Letter from Ernest McCullough

A third form is shown in Fig. 2 which uses less water and makes the surroundings less sloppy than either of the two methods already mentioned. Two narrow platforms slope towards each other with a fall of about 1 in. per foot. At the lower end between them is a strong box having over it a cover of sheet iron filled with holes ⅛ in. in diameter. Sides are placed on the whole apparatus, with the tops on a level, but no ends are used, the tops of the sides being level with the upper ends of the platform. At a hight about half way to the upper ends of the platform a number of 1-in. holes are bored in the sides to allow the water to run off. The water is introduced into the box and rises up through the perforated sheet iron, flowing away through the holes in the sides. The stone is shoveled into the sheet iron depression and then drawn with rakes up the sloping platforms, falling off the end in piles, or into wheelbarrows. This apparatus is very efficient if a good stream of water can be sent into the box.

Prevention of Dampness in Buildings

From William McClelland, London, England.—In the last issue of your valued publication there appeared an article on the above subject, to one feature of which I desire to take exception. Fig. 5 of the illustrations shows a wall rendered with asphalt and half brick built against it, or a space is left in the brick work by means of 1-in. boards which are withdrawn as hot asphalt is poured in at short hights of the work.

The defect of such construction is that hot asphalt is poured in at short hights of the work, say, rising two bricks at a time, then other two at a time, and so on until the whole is completed. The former application is cooling when the latter is applied, and this reheats the former application, so that when the whole is finished a viscid mass may remain in the wall buttressed only by 4½ in. of brickwork for a hight, as the illustration referred to shows, of 7 ft., 6 in.

In these circumstances the danger attending such construction is great, and especially so if the work is being carried on in warm weather. Moreover, the superincumbent brickwork may load this mass eccentrically, inducing a bending moment in a material that should be of itself pliable when cold, at least it is better that the stalk of rock-building composition be placed immediately under the center of gravity of the superincumbent brickwork, when the risk of such action will be reduced. There would be no danger, of course, should the inside of the 14-in. work be rendered in asphalt and the 4½-in. wall be built independently afterward.

The remedy is to place the rock-building composition up the center of the wall. In the 18-in. brick wall illustration, Fig. 5, two courses furthest away from the operator would be built up in mortar, the joints raked out ¾ in. on the inside face, or as the inner courses, leaving ¾ in. free of mortar, with ½ in. void vertically up the center of the wall, the liquid asphalt on being poured in keying into the voids and bonding what was before two distinct walls of 9-in. thickness, and thereby increasing the strength of the work materially. On the illustration, Fig. 5, it would have been preferable to have shown the asphalt next the 4½-in. brickwork to the outside of the wall, when it would have had the additional buttressing force of the earth and also its cooling properties.

I have drawn the distinction that the rendering with asphalt is a different matter from running in liquid asphalt, and shown that the latter method may be attended with grave risk unless the retaining wall is carefully designed.

Plans Wanted for Modern Home

From A. B., Union City, Pa.—I am thinking of building a house on a lot 70 x 80 ft., the front of the house to face the west. On the first floor I wish a reception hall, living room, dining room, kitchen, a bedroom and a bathroom. The living room should have a mantel and fireplace. The second floor is to contain sleeping rooms and possibly a sewing room.

Will some of the readers of *The Building Age* having plans to meet the above requirements kindly submit them to the editor for publication?

Construction of Store Fronts

From F. S., Grand Rapids, Mich.—I would like to have some practical reader contribute to the Correspondence Department of the paper details for store fronts showing particularly the framing below the plate glass.

I would also like to know how the heads of window and door frames are constructed to the same line in a solid or brick veneered house when a stone sill is used below the sill of the window frame.

It is quite possible that some of the other readers besides myself may be interested in the solution of these problems.

Surfacing a Dance Hall Floor

From W. N. A., Comox, B. C.—I am in need of information as to the treatment of the floor of a country dance hall after loggers have walked over it with corked shoes, and if there is any preparation that could be applied to it to fill the seams and holes made by the heavy shoes in question.

Is there any machine that can be used to surface the floor cheaper and to better advantage than hand planing and scraping? I trust that some of the practical readers may be able to give me the information I want.

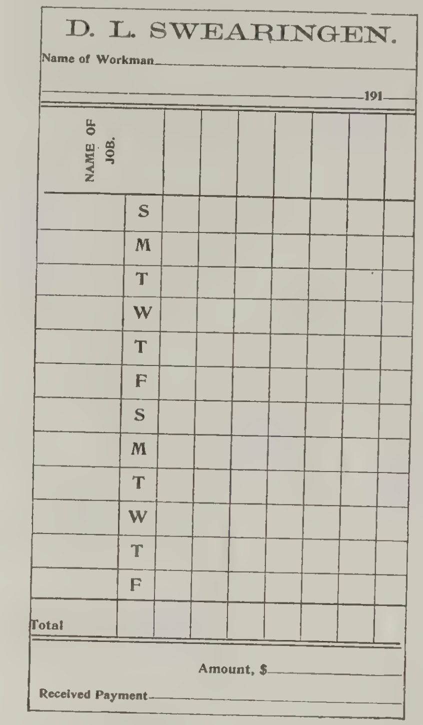
Note.—With no desire to anticipate what our practical readers may have to say in reply to the above query we would suggest to our correspondent that he make use of any one of the floor-surfacing machines which he will find described among the advertising pages of *The Building Age.*

After the surfacing has been completed the floor can be filled and waxed in the usual way.

A Workman's Time Check

From D. L. Swearingen, Sewickley, Pa.—Supplementing the interesting letters of correspondents who have submitted time checks for workmen, I enclose herewith the card which I have been using for some time past in my business as contractor and builder and which I find very convenient.

Note.—We have engraved both sides of our correspondent's time card and present them herewith.



D. L. SWEARINGEN.

Name of Workman

191

NAME OF JOB.								
	S							
	M							
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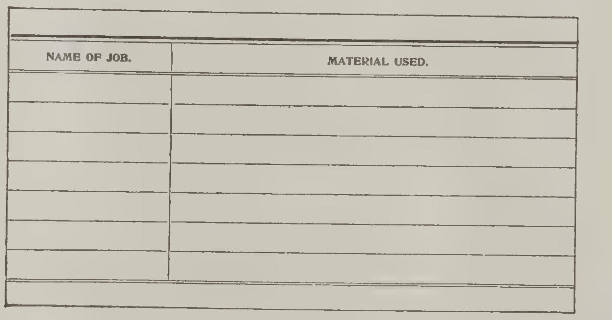
Total								

Amount, $

Received Payment

One Side of Time Check



NAME OF JOB.	MATERIAL USED.

The Opposite Side

A Workman's Time Check

Roof Truss for 50-Foot Span

From Practical Builder, Redford, N. Y.—With regard to the roof truss submitted by "C. J. M." on page 584 of the December issue of the paper I would say that in my opinion it is of very weak construction. The tie strain is at the center of the rafters instead of the feet. The whole strain comes there and the tie is merely spiked to the rafters. There is no strain where the rods are placed and they are therefore superfluous. No vertical tie should be used unless the rafters run to the peak and even then the effect of substituting inclined ties for the horizontal tie at the feet of the rafters is as follows:

When the elevation of the tie equals one-quarter of the whole hight the vertical strain thereby induced is equal to a weight of one-third of one-half the entire load; and when the elevation equals half the whole hight the vertical strain is equal to half the entire load.

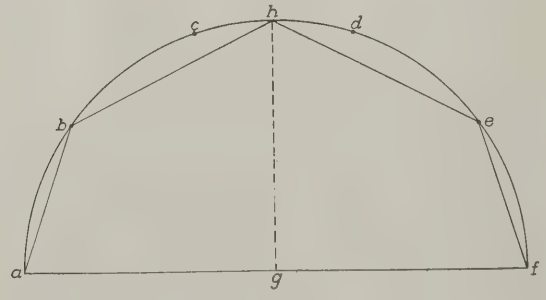
The truss published in the October number of *The Building Age* on page 476 will carry a locomotive. The rafters may be put on without affecting the truss in any way. The sizes of timber there given will carry a load of 141,000 lb. using 1⅛-in. rods and instead of the 4 x 4's make use of 3 x 12-in. A load of 20,445 lb. will be carried at *D* and *D'*, The top horizontal sustains a compression of 28,623 lb. and equals the tension on the tie beam. The compression of each truss is 35,778 lb. The counterbraces are necessary to prevent distortion when there is a greater load on one side of the center than on the other. They will carry 5,000 lb. each.

Proportions of Gambrel Roof

From J. G. M., Milton, Wis.—For the benefit of David Gates, who inquired in the January issue of the paper, as well as for any one else who wishes to construct a well-shaped gambrel roof, I submit the following as to the proper proportions—a rule which I have no doubt will be found in many of the handbooks, particularly Kidder's Architects and Builders Pocket Book.

Referring to the accompanying diagram the line *a-f* is made equal to the width of the front plus the eave projections on the center *g*. With a radius equal to half of this measurement describe a semicircle as *a-h-f*. Divide this into five equal parts, as at *b,c,d* and e and erect *g-h* perpendicular to *a-f*. Draw *a-b* and *e-f*, the side slopes, and *b-h* and *e-h* the upper slopes, then *a-b-h-e-f* will be the outline of the roof.

Perhaps it may be unnecessary, but I will add that the eaves should project 1 in. for each foot in hight from ground to eave plate.



Proportions of a Gambrel Roof—Diagram Submitted by "J. G. M."

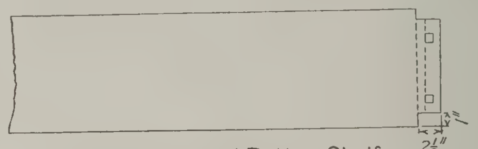
From D. P. B., Redford, N. Y.—In answer to the inquiry of David Gates in the January issue of the paper, I would say there is no law followed in gambrel roofs. The best examples give the first rafter 4/5 of the second; the first pitch 80 degrees, the second 35 to 45 degrees. Roofs of this nature are not given much weight in architecture. In this land of barns few are built—mostly small.

In the article on "Architecture" in the Encyclopedia Britannica not an example is shown; the glossary does not contain the words "curb-roof," "gambrel roof" or "Mansard roof"; "Modern Designs and Details" does not contain an example, likewise Woodward's "National Architect," while Ware's "Modern Perspective" has two ordinary examples.

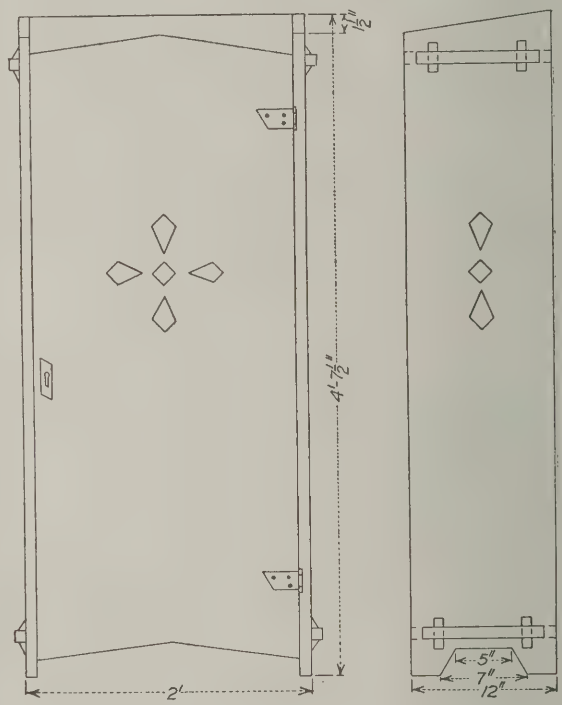
> "Gambrel?—Gambrel?" Let me beg
> You'll look at a horse's hinder leg—
> The first great angle above the hoof—
> That's the gambrel: hence gambrel-roof.
>
> O. W. Holmes, Autocrat.

Design for a Gun Cabinet

From H. A. F., Reading, Pa.—I am sending herewith drawings covering design for a gun cabinet which may be of use to "R. A. G.," Natic, Mass., who asked in a recent issue for a simple design of this character.



Detail of Top and Bottom Shelf



Front Elevation Side Elevation

Design for a Gun Cabinet—Scale ¾ in. to the Foot

The gun cabinet is made of material 1 in. thick and it stands 4 ft., 7½ in. high; is 2 ft. wide and 1 ft. deep. The dimensions upon the drawings indicate the principal measurements. The cabinet may be constructed either of plain or quartered oak and given a coat of Mission stain or it may be varnished, according to the taste of the correspondent.

Square Feet of Radiation Required

From W. M. L., Orange, N. J.— Will F. T. Fellner kindly give a list of square feet of steam, also hot water, radiators required for the rooms shown on his drawing on page 33 of the January issue.

Brick Veneer and Lap Siding Construction

From H. R. F., Mildred, Kan.—Will some of the readers give me through the Correspondence columns of the paper, details showing the construction of the outside walls of a house two stories in hight, the lower story to be brick veneer and the upper story to be covered with lap siding or other material? What I especially want to know is the construction at the point where the brick veneer and lap siding join.

I would be glad to have several answers showing different styles and methods of doing the work.

Flemish Bond in Brick Work

From D. P. Barry, Redford, N. Y.—Referring to the query of "E. G. H.," Atchison, Kansas, to which some replies have already been made by interested readers, I offer a few drawings which may possibly be of assistance to him as well as to others concerned in the work of bricklaying. Of my sketches Fig. 1 represents the elevation of a portion of a brick wall with Flemish bond with closers shown at the left of each header at the right hand end of the wall. At *a* and *b* is shown a defective way of stopping a portion of the wall instead of racking back.

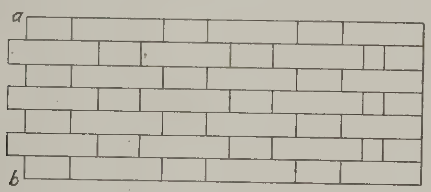


Fig. 1—Elevation of Wall Showing Flemish Bond

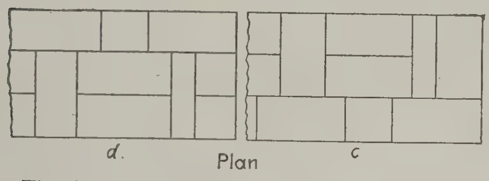


Fig. 2—Plans of Two Courses of Brickwork

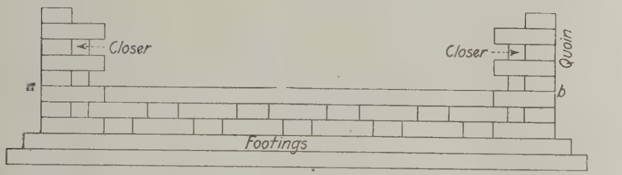


Fig. 3—Elevation Showing Working of the Wall

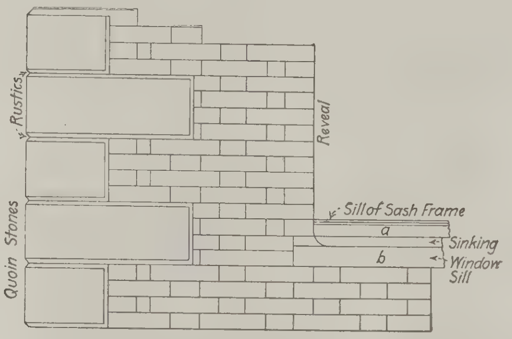


Fig. 4—Wall Showing "Quoin" Stones and "Rustics"; also Reveal and Window Sill

Flemish Bond in Brick Work—Sketches Accompanying Letters of Correspondents

In Fig. 2 are shown plans of two courses. Fig. 3 shows the working of a wall, the ends being run up a few courses with the plumb-rule and level. There is also shown at *a-b* the line for the next course, above which are indicated the closers at each end.

Fig. 4 shows quoin stones with rustics and a portion of a wall as far as a window showing reveal and window sills. Fig. 5 is a detail of Fig. 4 relating especially to the reveal and sills.

Figs. 1, 3 and 4 clearly show that no "bats" are permissible at the ends or reveals of brick walls.

In Fig. 6 the writer shows how "E. G. H." should lay his wall. Instead of putting a 2-in. closer at the left of the second course and a "bat" at the right, both should be in one piece. The 1½-in. "bat" at the right end of the bottom course cannot be used there, but must be used as a closer, as shown in Fig. 6. As to whether the closers and 6⅛-in. "bat" should be placed where they are drawn or to the right and left respectively depends altogether on the work below, which is not shown. A hacksaw, or, in fact, any old saw, is a good tool with which to cut closers.

In the English bond no "bats" are used at the ends of the wall or reveals, but are used as closers inside the headers. It may not be out of place to state that the Flemish bond is not used in Flanders at all, but is confined to the British Isles, and arose, no doubt, from looking at the end of brick walls. In Flanders, Holland and Rhenish Germany, which are bricklaying countries, no other kind of bond is found but what is known in England as English bond. It has, however, lately been noticed that mediæval brick buildings in the northeast of Germany are worked in Flemish bond, or, as it is called there, "cross-bond," and it is also to be seen in Brussels in work about the end of the eighteenth century.

For engineering purposes it is better to measure brick work either in cubic yards or reduce it to a basis of thousands by allowing so many brick to the cubic yard. With bricks measuring 8¼ by 4 by 2¼ in. and with joints ¼ to ⅜ in. in thickness, it requires something under 500 bricks to the cubic yard, and, allowing for waste, at least that number will be necessary.

The quantity of mortar required per cubic yard for standard bricks as above is as follows:

Joints ⅛ in. thick from 0.10 to 0.15 cu. yd. of mortar per cu. yd. of masonry.

Joints ¼ to ⅜ in. thick from 0.25 to 0.30 cu. yd. of mortar per cu. yd. of masonry.

Joints ½ to ¾ in. thick from 0.35 to 0.40 cu. yd. of mortar per cu. yd. of masonry.

With a fair average of cement we may estimate that with two parts sand to one part cement it will require about 2.75 barrels of cement and 0.80 cu. yd. of sand per cu. yd. of mortar; with four sand and one of cement it will require 1.6 barrels of cement and 0.95 cu. yd. of sand; hence for the ¼ in. joints there will be required 0.69 barrels cement and 0.2 cu. yd. of sand per cu. yd. of masonry for mortar made in the proportions of one of cement to two of sand.

A bricklayer and one helper will lay from 1000 to 2000 brick per day, depending upon the character of the work, which is equal to about 2 to 4 cu. yd.

The cost of bricks in building is from $10 to $13 per thousand—say on the average $11 per thousand or $7 per cu. yd. In all matters of cost a great deal depends upon the quality required and cost of transportation.

From A. C. B. N., Toronto, Canada.—In commenting on the letter of "W. M. L.," who presents an answer to the query of "E. G. H." in the October issue of the paper permit me to suggest what I consider a better way of constructing a 23 in. pier in Flemish bond with bricks measuring 8¼ x 3⅝ in. "W. M. L." seems to have forgotten one of the best points in brick work; that is, well constructed corners, and he has also presumably taken liberties with the size of brick by making a 4-in. header in his second course.

The sketch, Fig. 7, shows an isolated pier to illustrate the return whether it be 9 in., 14 in. or the full width, 23 in.

It would be interesting for "W. M. L." to draw down his pier construction in this manner and note the result.

Rendering a Cellar Damp-Proof

From Builder, Redford, N. Y.—Referring to the damp cellar problem, as described by "C. S. P.," Wilmington, Del., in the January number, I think the asphalt in the bottom as he has planned it will prove effective. Painting the outside wall, in my opinion, will be useless. Should he go to the expense of digging as he has planned he should set up "forms" and use 2 in. or asphalt concrete instead of paint. There is a concern out in Ohio that makes a composition block that probably would make a very good floor for his purpose. I think the cost is about $1.35 per square yard, and it requires but little concreting to prepare for it. It is sanitary and mold-proof.

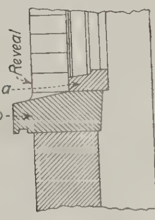


Fig. 5—Detail of Fig. 4

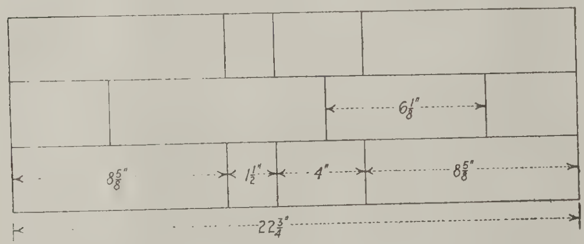


Fig. 6—Showing How the Wall Should Be Laid

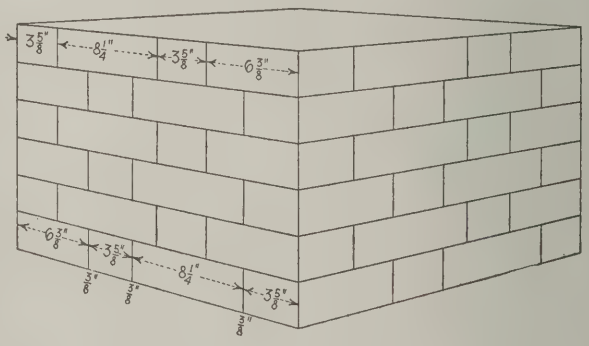


Fig. 7—Method of Laying Wall Suggested by "A. C. B. N.," of Toronto, Canada

Fleminsh Bond in Brickwork—Methods Suggested by Various Correspondents

Construction of Built-in Refrigerator

From W. S. P., Pottsville, Pa.—Will some reader of the paper who has had experience in this line kindly furnish plans and description for a built-in refrigerator for a dwelling house.

◆

Plans have recently been filed for the construction of a 14-story fireproof office and loft building in West 48th Street between Sixth and Seventh Avenues, New York City, and to cost $135,000. According to Architect William H. Gompert the façade will be of brick and limestone and the plan area will be 56.8 ft. by 96.5 ft.

Handbook for Architects and Builders

We have before us a copy of the 1913 edition of the Handbook for Architects and Builders, published under the auspices of the Chicago Architects Business Association and edited by Secretary Emery Stanford Hall. It is a volume of 368 pages and embraces a mass of information which every architect and builder will find of interest and value. While no set of rules can be formed which particularize all the manifold duties of the architect in his relations to the public, to his client, to the building trades and to his professional brethren, there are canons of ethics covering certain broad principles which should govern the conduct of members of the profession, and these are enumerated among the earlier pages of the volume.

There is a schedule of proper minimum charges and professional practice of architects recommended by the Chicago Architects Business Association; a list of members of the architectural profession who are permitted to practice in the state of Illinois, a list of members and officials of the architectural club; the building ordinance of the city of Chicago with amendments up to July 30, 1913; sections of the revised Code of Chicago governing electrical inspections, gasfitters' rules, specifications for standard hollow tile fireproofing, a definition of the rights of draftsmen to make plans for buildings in the state of Illinois, rules of measurement for inspection in concrete work, suggestions for lighting protection, standard specifications for structural steel for buildings, prepared by the American Society for Testing Materials, a practical system of indirect lighting, a chapter on heating and ventilation, strength of materials, treatment and finish of cement and concrete construction, standard classification of structural timber, standard rules of the measurement of plastering as adopted by the Employing Plasters of Chicago, some suggestions on wiring and specifications, glass and glazing, together with useful information concerning the building and engineering trades and materials.

Among the closing pages is a chapter on the Orders of Architecture and their application. Not the least interesting feature of this work is a subject index showing a system of classification for filing data, drawings, plates, catalogues, etc., in architects' and contractors' offices, an index to miscellaneous and useful information, also an index to the building ordinance.

Reminiscences of a "Bungalofer"

What One of the Oldest Followers of "The Building Age" Has to Say About the Evolution of the Bungalow

By L. Jerome Aimar

THE bungalow type of dwelling owes its popularity, largely, to its pleasing proportions. Just as the tall and stately steeple appeals to our sense of beauty, so does, by contrast, the long, low roof lines of the bungalow.

There is something remarkable though, in the strong hold this type of dwelling has taken upon the fancy of the American people. I remember some years ago the architectural publications gave much space to the question as to whether America would evolve a distinctly national type or style of architecture, and at that time there were many whom we firmly believed to be authorities on such matters, who placed a damper upon our aspirations, arguing that architecture constituted the one and only art that had reached perfection centuries since, and left us nothing to do but slavishly copy the model set before us.

The Preliminary Sketches

It was about this time that I remember having amused myself sketching little low-roofed structures, and then working them out to scale. Friends seeing these would remark:

"That's very pretty, but don't you think it would look much better if the roof were raised a foot or two higher? I imagine it looks rather squatty; but, I suppose you have to draw up what people wish or ask you to. I wouldn't want a thing like that. First place, I don't think sleeping upon the first floor a healthy procedure."

When told that I thought of providing a couple of sleeping rooms up under the roof they said:

"Oh, one would not be able to breathe up there. It would be fearfully hot. To sleep up there would take all the vitality out of one."

Perhaps this might have been a physician thus arguing, and it was quite probable that his granddad first saw the light through a little "peep-hole" in an attic, during the month of August, the year the "cricks" all dried up. And his grandmother may have been born in an apartment to enter which one descended two or three steps below the level of the street; further, that they both came nearer reaching the century mark than we will.

For years these little sketches lay around my desk. A diminutive, roughly sketched perspective upon a letter head of one of these freaks of my imagination, one day caught the eye of a caller who had spent several years in the Far East. He remarked that "it reminded him of the sort of house he lived in while in India," and went on to tell of his life there. Of the terrific hot days and nights; torrential rains, snakes, insects and so on. In reply to a question he said that "he did not mind it; that he slept in a hammock suspended from the rafters of the veranda, protected from prowling animals by 'jalousies' surrounding the veranda and a 'mosquito bar' of calico over his hammock."

The Bungalow

Some time after this man had left my mind reverted to the subject of our conversation, and my gaze to the sketch which had occasioned it. A train of thoughts were set up which ended in my taking up the sketch and writing under it "The Bungalow." This I did, perhaps, more to remind me that my friend had thus termed the native dwellings than from any other reason.

Years after, when we thought ourselves in a position to acquire a home of our own, we, my "better half" and myself, would sit for hours—as so many others have done—and plan our prospective home.

My wife, from reasons of propinquity perhaps, felt very kindly towards those little idiosyncrasies of mine; but, when it came to a question of retiring to rest by closing the front door from the outside, she reflected that objections might be raised to this unconventional mode of existence by the Society for the Prevention of Return to Primeval Instincts or some other organizations upon that order. Then, too, she thought she would sleep with far more peace of mind with some more substantial protection from the "bean shooter" of the small and precocious progeny of our neighbors than the porch columns afforded. Better perhaps to climb a ladder to the ridge pole, suspend our couches from that and kick the ladder down, or better yet, draw it up after us.

We built our home, but, of course, did none of these things. We were afraid of public opinion and criticism. But we did ease our roof down a foot or two below the prevailing level.

Opportunity to Become Rich

Before the house was half finished, its lines, seen partly from the plans and partly from the building itself, appealed so strongly to a party that an offer to lease it for a term of years was made us, at a rental which looked so good that we thought strongly of renting a deposit vault in the local bank for its safe keeping. Needless to say, the opportunity to become rich was accepted after the shedding of a few tears.

It might interest the reader to learn that the house was sold, after the lease had expired, to another party who was in position to offer us more for it than the tenant could. Since then we have built a number of times, and in every instance some one has come along and dispossessed us, at a modest profit to ourselves, and the funds thus acquired have gone a long way in providing us the necessities of our existence.

Thus, you see, we have made the "artistic" phase of the question remunerative and proven to our own satisfaction at least that something more is required to meet the approval of a certain class of people than a tight roof and "fret work" ornamentations.

My wife adds at this point, "Oh, but the horrid things we were called upon to listen to anent your 'sawed-off columns' and your 'hayrick' roofs." But what's the odds; cannot every architect, working along similar lines, duplicate my experiences?

The Bungalow as Finally Constructed

Each time that we have built we have gained more confidence, and lopped off a foot or two from the perpendicular and stuck it on behind, so that now we are domiciled in—as the children say—"a true and true" bungalow, the eaves of which are in proximity to mother earth. 'Tis true, our home is modest and inexpensive but, nevertheless, one which possesses many of those little touches of artistic individuality which reflect the true instincts of the lover of home.

And here we hope to rest; happy in seeing the fulfillment of our dreams springing up around us, and in the belief that America has indeed developed a truly national style of architecture, in doing which she has borrowed, in common with all other nations, largely from the Far East.

At the risk of proving tiresome to my readers I ask their indulgence for a few moments while I give a look at the subject from an opposite viewpoint.

Aside from the merits of the bungalow type of dwelling experience forces me to add that, from the viewpoint of those who wish to obtain the maximum amount of room for the least expenditure, believe me, the type is not an economical proposition, as I might easily prove.

The Cheap Imitations

It is largely because of the comparatively greater cost of the bungalow type of structure, that we find such a growing number of communities consisting of a horribly cheap class of structures, nothing more than mean "shacks," with every detail shaved down and lopped off so that nothing remains but the bare skeleton of the building. The wide projecting eaves, which is one of the most distinctive and picturesque characteristics of the true bungalow, are shaved off close and completely to save a couple of bunches of shingles.

The wide clapboards give place to that cheap abomination known as "novelty," "Dutch" or "barn siding." The "native stone" fireplace gives way to the mean little 8 x 8 in. flue of common brick. The picturesque underpinning, which so charmingly follows the contour of the lot and makes the building appear as though it was part of and grew out of it, is substituted by spindly puncheons, from which they even scrape the bark, and thus exaggerate and make so evident the utter lack of sentiment upon the part of builder. And all these are termed bungalows, mind you. Like every good thing, it has become "hackneyed" to such an extent that its soul has departed. So little thought is given to any merit that a design might possess that a set of plans, warranted to fit any site, is given away by the "mail-order houses" to the purchaser of a spool of thread or a quarter of a pound of tea.

And my! What a "godsend" and source of profit it has proven to the "jerry" builder, who has thus been enabled to hang out a shingle setting forth that "This Bungle Oh" is built by

Jeams Clapdash
Carpenter and builder.

If ever I run across that sketch of mine I intend erasing that word "bungalow" before I become further ashamed of it.

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The Minnesota Association of Builders Exchanges

At the annual meeting of the Minnesota State Association of Builders Exchanges held in Duluth in December, the following officers were chosen for the ensuing year:

President.....H. M. Gardner, Minneapolis
First Vice-Pres....F. H. Romer, St. Paul
Second Vice-Pres.....E. J. Zauft, Duluth
Third Vice-Pres...O. H. Olsen, Stillwater
Fourth Vice-Pres..
W. S. Kingsley, Faribault
Fifth Vice-Pres...Olaf Swenson, St. Paul
Sec. and Treas..
Eugene Young, Minneapolis

Executive Committee.—James Leck, of Minneapolis; F. J. Nixon, of Duluth; J. D. Roberts, of St. Paul; Fred S. Lammers, of St. Paul, and James O'Neil, of Faribault.

One of the reports presented was from a special committee on the subject of a mutual insurance company to carry insurance under the new Workmen's Compensation Law. A paper was presented by Elmer H. Dearth, secretary and manager of the Michigan Workmen's Compensation Company, showing the advantages accruing from the organization of a mutual insurance company.

A general discussion of the subject of the organization of a company for the purpose of carrying Workmen's Compensation Insurance ensued and the sentiment in favor of the movement was practically unanimous.

The members of the Duluth Builders Exchange entertained the visiting delegates at dinner at the Commercial Club after the morning session and in the evening they all attended the theatre.

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Three log cabins are to be constructed in the city of New York to be placed in Highbridge Park, Isham Heights Park and Fort Washington Park. The cabins will be built of chestnut logs, some of which were cut from trees in Forest Park, Queens, that died in the past few years because of blight.

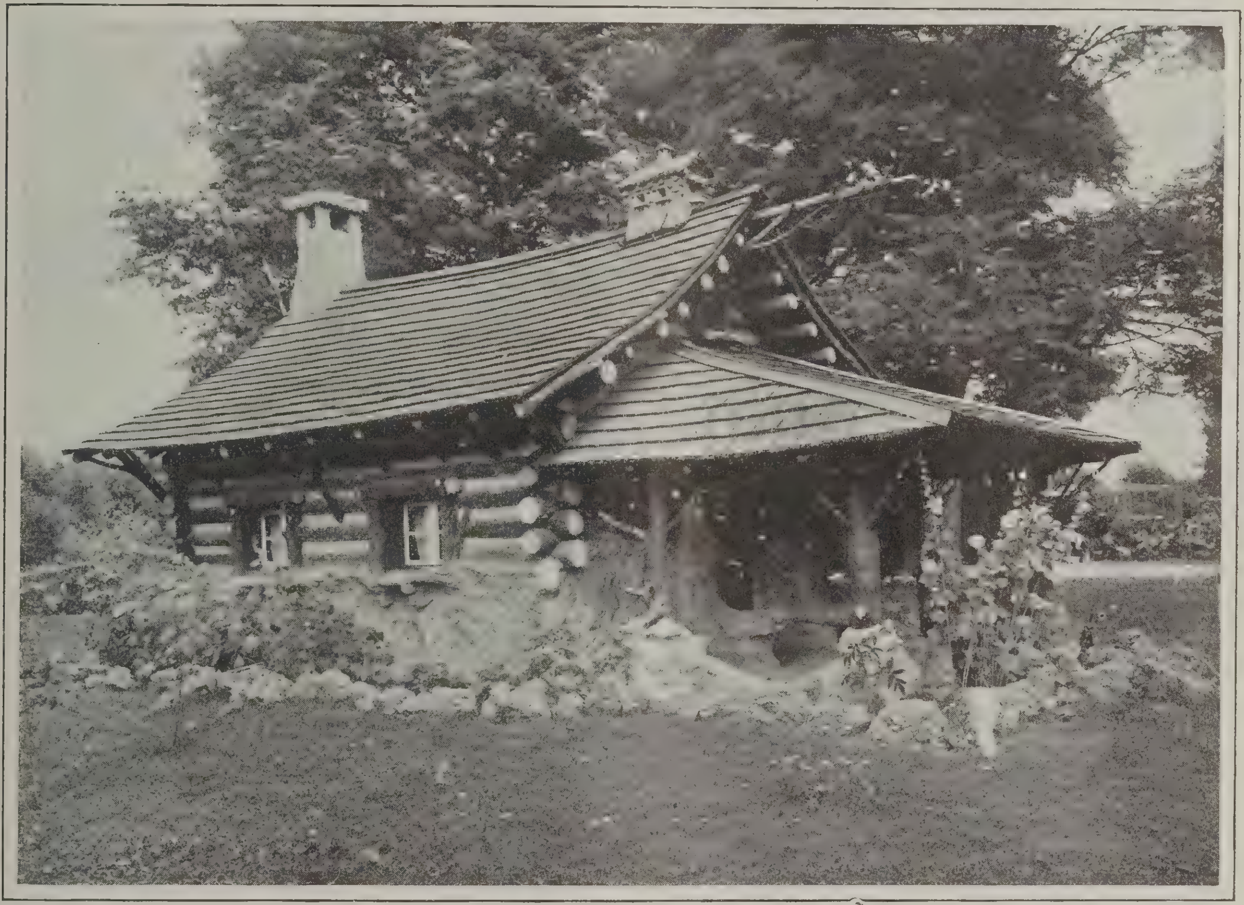
Something About Concrete Log Cabins

A Style of Building That Is Becoming More or Less of a "Fad" in Some Sections of the Country

LIVING in log cabins, temporarily, is becoming quite a fad in and about some of the larger cities of the country, more particularly perhaps Cincinnati and Philadelphia. Many large suburban homes and country estates are now being built with log cabins in connection therewith, but as logs for these cabins are scarce articles, cement is being largely used in their construction.

These cabins really ought to be called cement or concrete log cabins for there is more cement and concrete used in their construction than logs. Cement and concrete proves to be much cheaper than logs to-day and herewith is illustrated one of these modern creations in the combination of the very oldest form of home building with that of the most modern in concrete.

The concrete used in this log cabin building is a very simple mixture of Portland cement, sand and coarse gravel. The mixture lends itself to wonderful cave rock formations and the cabins of its construction are wonderfully artistic. No large rocks are employed in the construction as may be supposed from the accompanying illustrations. Where large rocks are wanted, this is taken care of by large chunks of the broken concrete. Various coloring matters are added to the cement in the mixing and most any color is thus obtained in the finished cabins, the most popular being cream and a light shade of green to harmonize with the grass and surrounding trees. Concrete is used in the walls, half way up, and in the interior. The mantel is usually of cement construction and cement is plastered between the logs and fills up crevices between the rafters where mud was originally used in the old time cabins.



Something about Concrete Log Cabins—An Interesting Example in a Cincinnati Suburb—Designed by Louis Kuertz, Hazelwood, Ohio

The log cabins vary in size from one-room affairs, sometimes called "dens," to the more pretentious having three rooms, consisting of a tiny kitchen, a bedroom and a living room, where one may spend an evening, or a vacation in real log cabin life communing with nature and the early life of the settlers when the Indians roamed the forests.

They were designed by Louis Kuertz, of Hazelwood, Ohio.

Wages in Building Trades in 1914

The United Board of Business Agents of the Building Trades of Manhattan and Vicinity has just issued the schedule showing prevailing rates of wages in various branches of the industry for 1914, and we present those most likely to interest our readers. The schedule is based on eight hours' work per day, except on Saturday, when work ceases at noon. Compensation for a practical foreman ranges from 50 cents to $1.00 a day over and above the schedule as here given.

All recognized legal holidays and Sundays are to be figured at "double time."

Asbestos workers, boiler felters, pipe coverers, insulators.	$4.75
Asbestos workers' helpers	3.00
Blue stone cutters, flaggers, bridge and curb setters	4.50
Blue stone cutters' helpers	3.00
Bricklayers	6.00
Bricklayers helpers	3.00
Carpenters and framers	5.00
Cabinet makers	5.00
Cement and concrete masons	5.00
Cement, concrete and asphalt laborers	3.00
Derrickmen and riggers	4.00
Decorators and gilders	4.50
Decorative art glass workers	5.00
Elevator constructors	5.28
Elevator constructors' helpers	3.40
Electrical workers	4.80
Electricians' helpers	2.20
Electrical fixture workers	4.80
Engineers, stationary	4.50
Engineers, portable hoisting, etc., $30.25 weekly; by the day	6.00
Framers	5.00
Granite cutters, $5.00 yard; bridge	5.50
House shorers, movers and sheet pilers	3.75
House shorers' helpers	2.65
Housesmiths and bridgemen	5.00
Ironworkers	5.00
Ironworkers' helpers	3.50
Ironworkers' apprentices	3.00
Metallic lathers	5.00
Marble cutters and setters	5.50
Marble carvers	6.00
Marble polishers	4.40
Marble sawyers	4.65
Marble bed rubbers	4.90
Marble cutters' helpers, $3.25; rigging and crane operators	3.75
Mosaic workers	4.50
Mosaic workers' helpers	3.00
Machine stone workers	4.00
Plate and sheet glass glaziers	3.50
Plasterers, plain and ornamental	5.50
Plasterer modelers	$30 to $100 weekly
Plasterers' laborers	3.25
Plumbers and gas fitters	5.50
Painters	4.00
Painter-decorator, painter-striper, painter-gilder	4.50
Painter-letterer, painter-grainer, painter-varnisher	4.50
Roofers, tar, felt, composition, damp and waterproofers.	4.25
Rockmen	2.50
Sheet metal workers, metal roofers	5.00
Slate and tile roofers	5.00
Steam, hot water and general pipe fitters	5.50
Steam fitters' helpers	3.00
Tile layers	5.50
Tile layers' helpers	3.25
Upholsterers	4.50
Varnishers	4.00
Wood lathers on new work, $3.50 per M.; overhauling jobs	5.00

Something about Concrete Log Cabins—Front View of one showing the cave-like effects of the Concrete

In a few cases rates quoted involve a slight advance which went into effect on the first of the current year. For example bricklayers wages were advanced from $5.60 to $6.00 per day, stone setters from $5.60 to $6.00 per day, and electrical workers from $4.50 to $4.80 per day.

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Montreal is to have another 10-story steel skeleton frame building which is estimated to cost $350,000. It will have a frontage of 78 ft., a depth of 104 ft. and will be 130 ft. high.

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During the fiscal year ending with July, 1913, there were 17,269 buildings erected in Los Angeles, Cal., costing $33,843,823.

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The New York State College of Forestry at Syracuse urges the use of forestry in courses taught in the public schools.

Legal Status of the Subcontractor

Basis Upon Which Rests His Right to a Lien on the Premises Whereon His Work Was Done

By Bertrand Sherburne

"A SUBCONTRACTOR is one who takes from the contractor a specified part of the work" (Rankin v. Rankin et al., 122, P. 1120), and there his troubles begin for he is not dealing with the owner, but with one who has contracted with the owner, and when he looks to the owner for reimbursement for services rendered on his subcontract, he frequently finds that he has not complied with certain requirements of the law which would have rendered his claim valid.

Under the common law the subcontractor could not recover against the owner. In the case of N. J. Steigleder and Son v. Allen (75 S. E., 191), the court says: "At common law, there being no privity between an owner of property and a subcontractor, who had agreed with the general contractor alone to construct a portion of a building for the owner, such subcontractor had no legal claim which he could maintain against the owner for work done or material furnished under his contract with the general contractor."

Meaning of Privity Defined

"Privity" is defined as: "Connection, interest, mutuality of interest, as subsists between the immediate parties to a contract." Therefore, unless it could be shown that such a "privity of interest" existed, the subcontractor was without recourse as against the owner. So many abuses resulted from this condition that state legislatures began to provide remedies, and we have the great mass of so-called "statutory" law bearing upon the subject.

The right of the subcontractor to recover from the owner or to obtain a lien upon his property rests, therefore, upon the laws enacted for this express purpose by the legislatures of the different states. This has caused the courts to construe such statutes strictly and to be very careful not to grant a greater measure of relief than was explicitly provided for in the statute itself.

A Strict Construction of the Law

As an instance of this strict construction may be cited the case of C. C. Belknap Glass Co. v. Kelleher et. al., in which the Supreme Court of Washington says in its opinion, handed down April 1, 1913: "The complaint was clearly defective. It was alleged that 'on the 14th day of September, 1911, plaintiff, at the special instance and request of James Duffy and Kohler and Chase, a corporation, commenced to furnish material and perform labor, which material was used and which labor was performed in and about the construction and alteration of a certain building or structure on the premises hereinabove described, which material was of the reasonable value,' etc., but there was no allegation of the relation of James Duffy or Kohler and Chase to the owners of the property, that is to say, there was no allegation that they were the actual agents of the owner of the property, or were contractors, subcontractors, architects, builders or persons having charge of the construction of the building on which the lien is claimed. Persons standing in one or the other of these relations to the owner are the only persons that can lawfully bind his property for materials or labor used in the construction or alteration of a building thereon and a complaint, if it be not subject to demurrer must set forth that the materials and labor for which the lien is claimed were furnished either at the instance of the owner or some person bearing this statutory relationship to the owner."

The Attitude of the Courts

As a further illustration of the attitude of the courts with regard to the strict construction of the statutory laws relating to mechanics' liens may be cited the decision of the United States Circuit Court of Appeals of the Sixth District, filed on January 7, 1913 (201 F., 901) above cited, in which the court says:

"The statute authorizes a lien in favor of mechanics, laborers and material men and provides that no person shall acquire this lien unless he shall notify in writing the owners of the property to be held liable or his authorized agent immediately after the last item of material or labor is furnished of his intention to hold the property liable, and the amount for which he claims a lien. Nothing is left to inference or conjecture. A compliance with this provision is, as we think, *conditio sine qua non.* A lien such as is sought here for labor performed or material furnished, is unknown to the common law and is purely a statutory one. That there must be a substantial compliance with the terms of such statutes is everywhere maintained, and the right created thereunder can only be availed of in the manner and upon the conditions provided for in the act giving the lien. The language of the statute is clear and unambiguous and leaves no room for construction.

Knowledge of the Law Essential

It is evident that a knowledge of the mechanics' lien law of his state is very important to every architect, builder and material man, or to the man who intends to erect a dwelling or other structure, and as a copy of the law is easily obtainable, there can be small excuse for the man who runs the risk of loss to himself or others through ignorance of the provisions of the statute.

An examination of the mechanics' lien statutes of the various states will show that two methods have been adopted for applying the benefits of the statutes to subcontractors. The earlier method which is still adhered to in many states, was to give the subcontractor as well as the contractor an absolute and direct lien upon the property. This entailed hardship, for the owner must, in order to protect himself, retain in his own hands a sum sufficient to pay the claims of subcontractors against the principal contractor. So burdensome did this become that later statutes provided a time limit within which these subcontractors' claims must be filed. To show, however, that this direct lien provision is still adhered to, in the case of some states, it is sufficient to cite the case of Collins et. al. v. Board of Trustees of Davis and Elkins College (79 S. E., 10) in which the Supreme Court of Appeals of West Virginia, in an opinion filed June 17, 1913, has some interesting things to say with regard to the mechanics' lien laws in general:

"The present statute gives a direct lien to one performing labor or furnishing material under a contract with the principal contractor or his subcontractor. To that extent it embodies the so-called Pennsylvania system, as contradistinguished from the New York system which was the basis of the former statute contained in Code 1887, Ch. 75. (Hunter v. Truckee Lodge 14 Nev., 24.)

The Direct Lien

"But in construing the present statute, section 3 which gives this direct lien, must be read in connection with Section 5, whereby the owner may limit his liabilities by recording his contract with the principal contractor. . . . Here we have that which gives the owner right to limit his liabilities under the contract. . . . Both provisions must be given effect. Taken together they plainly say that no payment by the owner to the contractor may effect or impair a lien, still the owner may record the building contract and thereby limit his liabilities under it so that the amounts to be paid by him shall not in the aggregate exceed the contract price. When one is about to perform labor or furnish material, he has notice by the recorded contract that payments may have been made and his right to lien thereby cut down or limited to the residue of the contract price."

The "New York system" referred to by the court in the preceding extract, is a more recent method of providing for action against the owners on the part of the subcontractor, and it has been adopted in many states. By this system the subcontractor is permitted, on giving notice of his claim to the owner, to intercept the money due from him to the contractor and to cause it to be paid to himself, instead of to the general contractor. In this system the subcontractor has no absolute lien upon the property.

The relation of these two systems is well set forth by the court in the case of Merrigan v. English et. al., 22 P., 454, in which the Supreme Court of Montana says:

Protection of Wage Earners

"The tendency of land owners to enter into contracts at a figure so low that the original contractor could make no profit unless he refused to pay his employees has led to the enactment of laws for the protection of wage earners. There are two systems generally adopted throughout the United States—one known as the 'New York system,' the other as the 'Pennsylvania system.' The former gives to the subcontractor a lien by way of subrogation, as it is termed by the text writers, which is accomplished by a notice given to the owner by the subcontractor, which notice specifies the probable value of the services to be performed, or of the materials to be furnished, and the owner is thereupon entitled to withhold from the contractor money due to the latter to such an amount as will meet the demand. These are the general features of the New York system. . . . The other, or Pennsylvania system, gives a direct lien to the laborer or subcontractor either by an agency created by the statute, or by an implied agency vested in the original contractor.

"An interesting discussion of this subject will be found in the very able opinion of the learned Chief Justice Beatty upon the petition for rehearing in the case of Hunter v. Truckee Lodge, 14 Nev., 24" [above cited] . . . "The distinction referred to is this: Under the New York system the subcontractor cannot recover more than is due from the owner to the contractor, that is to say, he is bound by the original contract; while under the other system, the original contract or payment to the original contractor is no defense to a claim of a subcontractor."

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Seasoning Wood by Electricity

In describing his latest researches in the electrical seasoning of timber Dr. Nodon states that his process can be applied in the forest where the trees are felled, since no cumberous or costly equipment is required. The newly-felled trees are sawn into thick planks and laid on a false flooring, one on top of the other, with the interposition, however, of moistened matting or similar material between each layer to act as electrodes for the introduction of alternating current, which is passed for ten hours or more.

The effect of the current is to produce chemical changes in the cellulose and the sap, rendering them impervious to decay. Furthermore, the sap is said to lose those gummy and hygroscopic characteristics which normally prevent rapid drying. It is claimed that timber thus treated is ready for use a few weeks after it is felled and is harder, stronger, more homogeneous, easier to work and less warped by moisture than timber which has been seasoned by the ordinary air-drying process. The statement is made that paving blocks treated by the Nodon process have been in use at Bordeaux, France, without showing appreciable deterioration.

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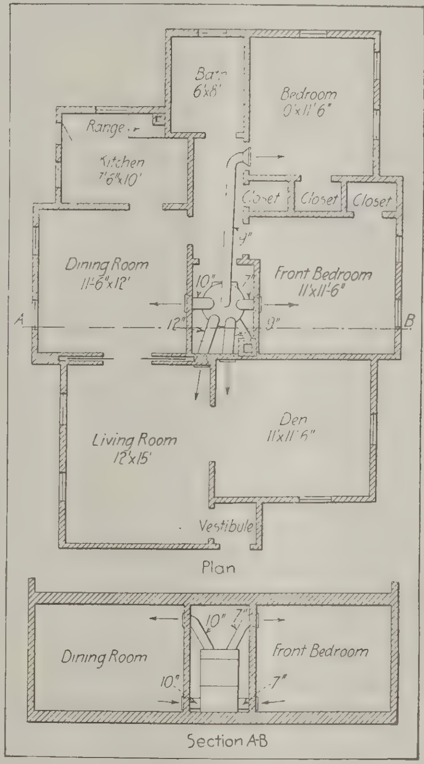
Nine species of birch grow in the United States, but sweet, yellow, paper, and river birch are those most used. About 45,000,000 board feet of the wood finds its way to the market yearly. Paper birch is one of the few American species with a hold on the forest stronger than it had when America was discovered. Large tracts are now covered with this birch where there was little of it a century ago. It comes in after fire, and some tracts cover hundreds of square miles.

Unique System of Heating a Bungalow

There Being No Cellar, the Furnace Was Set on the Same Floor as the Rooms to Be Warmed

THE preference shown the warm-air furnace system of heating by an Oregon real estate concern, operating where the ground water was so close to the surface that no basement could be constructed, eventually brought the problem of designing a successful furnace heating system to the attention of the Marshall Furnace Co., at Marshall, Mich. The conditions made it impossible to dig cellars or basements in which a heating apparatus could be located and the solution of the problem is shown in the accompanying plan and in the section through the dining room and front bedroom.



Unique System of Heating a Bungalow—Plan Showing Position of Furnace and Registers

It will be seen that a hall is arranged in the center of the bungalow and at one end there is a room which was provided with a thick cement floor and lined with asbestos boards to make it entirely fireproof. In this room there was located as shown a No. 40 Wolverine warm-air furnace which has a fire-pot 20 in. in diameter and a grate 19 in. in diameter. The casing is 40 in. in diameter and the furnace is rated to have a capacity to warm a dwelling containing 20,000 cu. ft. of space.

This furnace was placed directly on the floor, as shown in the sectional elevation on a level with the other rooms in the bungalow. The warm-air pipes were taken out of the top of the furnace in the usual manner and carried to registers placed near the ceiling in the side walls of the various rooms located close to it. The cold-air supply for teh furnace was secured by returning air from the rooms through pipes connected with the bottom casing which led from registers located in the side walls of the various rooms near the floor level.

To one room, a bed room in the rear, a pipe was run to a register placed in the wall just above the door. No attempt was made to return the air from this particular room direct, space being provided beneath the door so that air could flow into the hall and thus allow a continual inflow of warm air. This location of the furnace necessitates some care in taking up the ashes from the furnace and in keeping the room perfectly clean.

The builder of the bungalow has stated that "the furnace heating installation is fine and is very pleasing to all who have come in to look at the great novelty which a furnace placed on the same level with the work it has to do has proved to be."

The occupant of the bungalow writes: "Within a very few minutes after the fire is started, the heat pours out of the hot-air registers and everything works fine. Everyone is delighted with the way it works and the man who put it in says it works better than if it were put in the basement. It has proved a delightful success in every way, and the pipe running along in the back hall is no objection whatever. This setting of the furnace has solved the problem of hot-air heating where a basement is not possible."

It is pointed out that one reason why the job works so satisfactorily is that the furnace is amply large enough to work. The temperature in the town where the furnace is installed seldom falls lower than 10 deg. F. The coldest temperature registered by the weather bureau is 2 deg. below zero.

The table on the next page gives the dimensions of the various rooms, the space heated, the equivalent glass surface exposed, assuming that 4 sq. ft. of wall surface is equivalent in cooling effect to 1 sq. ft. of glass, the diameter and area of the warm-air pipes and of the return pipes from the different rooms. This furnace heating system was shipped complete from Marshall, Mich., and the pipes were made of the various sizes both to suit the work and so that they would nest, as the shipment was a long one and rather expensive.

Consequently, the pipes are no larger than would be ordinarily used in warm-air heating, although they are generous in size according to the opinion of furnace heating contractors in a mild climate. The generous size of the pipe has the advantage of affording little restriction to the flow of air where there is so little head to facilitate the movement and it is certainly one of the helps in making this heating system satisfactory in every

Assuming that each square foot of equivalent glass surface loses 85 heat units per hour in zero weather, there would be required 41,225 heat units per hour, and assuming as high efficiency as 8000 B.t.u. from the coal consumed but 5.1 lb. per hour would be required. As the grate has an area of about 2 sq. ft. a consumption of 2½ lb. of coal per square foot per hour would be ample to offset the heat losses. The table shows that there are 8320 cu. ft. of space to be heated and to raise this amount of air to a temperature of 140 deg. would require 21,140 heat units, but half of which would be available for maintaining a temperature of 70 deg. in the bungalow under zero conditions with an outdoor air supply.

In this instance, however, it is improbable that the air returning from the rooms heated to the furnaces would be much below 60 deg. in temperature when the house was being heated, consequently the tax on the furnace would be something materially less than even with a generous allowance for ventilation by leakage. A different condition is presented, however, by the fact that the air is taken from within the building, in all probability seldom at a lower temperature than 60 deg., so that the furnace, if it discharges the air at 140 deg., would only have the tax of raising the air from 60 to 140 deg., or a rise of 80 deg., and to raise 8320 cu. ft. of air 80 deg. requires 12,080 heat units.

Table of Dimenions and Pipe Areas

	Dimensions	Space heated cu. ft.	E.G.S. sq. ft.	Warm air pipe dia.	Warm air pipe area	Return air pipe dia.	Return air pipe area
Living-room ..	12×15×10	1800	110	12	113	10	78
Den	11— 6×13×10	1495	81	9	63	9	63
Dining-room ..	11— 6×12×10	1380	64	10	78	10	78
Front Bedroom	11— 6×11×10	1265	66	7	40	7	40
Back Bedroom.	11— 6×10×10	1150	83	9	63	..	..
Kitchen	7— 6×10×10	750	56	..	..	..	..
Bathroom	6× 8×10	480	25	..	..	..	..
		8320	485		357		259

The number of heat units required to offset the loss through equivalent glass surface is 41,225, and this amount divided by the 12,080 shows that there must be 3.4 air changes per hour to bring in the required amount of heat. By multiplying 8320, the cubic feet of air in the building, by 3.4, the number of times the air must be changed, it will be seen that there must pass through the furnace 28,288 cu. ft. per hour. This, divided by 3600, the number of seconds in an hour, will show that 7.8 cu. ft. of air must pass through the furnace every second.

Inasmuch as the hot-air pipes have an area of 2.4 sq. ft., by dividing 10.6 by 2.4, it is shown that a velocity of 4.4 ft. per second through the heater and piping will be sufficient to accomplish the desired results. The kitchen is heated by the range and the bath room is heated by placing the range boiler in it and running the pipes from the water back in the range to this boiler.

New York Workman's Compensation Law

Under an act of the New York legislature, now effective for administrative purposes, employers engaged in the construction, repair or demolition of buildings, and members of certain allied trades, will become liable, after July 1, 1914, for the payment of compensation for injuries to their workers, sustained in the performance of such work, regardless of negligence, except that an employee is not entitled to compensation for injury sustained through his own willful act or intoxication. Theoretically, employers are not bound by the act unless they voluntarily choose to come under it, but it is practically compulsory on account of its provision that if an employer fails to secure payment of compensation for his injured employees and their dependents according to the requirements of the law, claim for injury to, or death of, a workman may be enforced either under the law or in an ordinary suit for damages. In the latter case the employer is prevented from pleading as a defense that the injury was caused by the negligence of a fellow servant or that the employee assumed the risk of his employment, or that the injury was due to the contributory negligence of the employee.

The New York Compensation Act is the latest law of its kind in the country, and is the product of accumulated experience in the efforts which have been made throughout the land to introduce the system. It bears evidence of a careful attempt to avoid objections upon which the New York law of 1910 was declared by the Court of Appeals to have been unconstitutional, and so closely follows the general plan which has been adopted in other states, with the sanction of the highest courts of those states, that the Court of Appeals would seem to be bound to depart from the views of nearly all the other appellate courts of the country, in order to adjudge this law to be invalid. In this connection it will be interesting to note that the latest tendency of the courts is to regard the compensation system as being intended, not to impose any *penalty* against employers or to provide a *charity* at their expense in favor of injured workers, but to make the cost of personal injury losses in hazardous employments an element of the cost of economic production, to be borne by the "ultimate consumer." At least this is the reasoning of Justice Marshall, of the Wisconsin Supreme Court, in an opinion handed down by that court in a case which was recently before it involving the Wisconsin Compensation law.

The New York law seems to point out to employers a better means of estimating future losses on account of accidents to their workmen than has been open to them, by carrying insurance under the terms provided for by the new act. This advantage and the further advantages arising from the fact that the schedule of compensation to be paid for various classes of injuries is much below the amounts commonly allowed by juries in personal injury cases for the same kind of physical disability will be found to go a long way toward overcoming, if they do not more than overcome, the prejudice arising from the fact that an employer is made liable for accidents occurring without negligence attributable to him.

The law does not cover all employments, extending only to certain industries which are severally grouped as involving "hazardous" work. Application of the act to the building trades depends upon their falling within a group composed of the following industries: "Stone cutting or dressing; marble works; manufacture of artificial stone; steel building and bridge construction; installation of elevators, fire escapes, boilers, engines or heavy machinery; brick-laying, tile-laying, mason work, stone-setting, concrete work, plastering; and manufacture of concrete blocks; structural carpentry, painting, decorating or renovating; sheet metal work; roofing; construction, repair and demolition of buildings and bridges; plumbing, sanitary or heating engineering; installation and covering of pipes or boilers."

The Basement of the Modern Dwelling

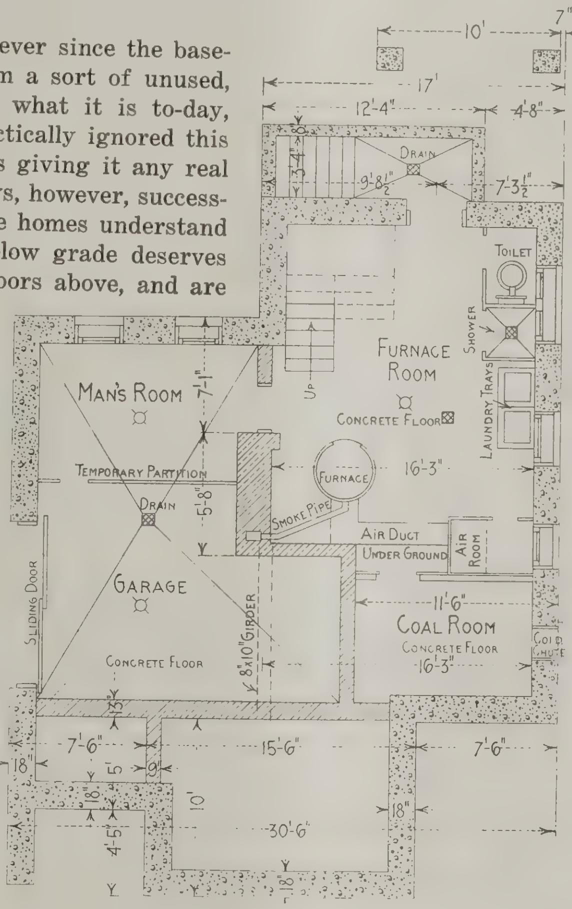
Relative Position of Heater and Coal Bin—Arrangement for Delivering the Coal Supply—Some of the Modern Conveniences

By G. D. Crain, Jr.

In the modern house, regardless of size or cost, the basement is about as important as any other part of the building, and a good deal more so than some portions to which even greater attention has been devoted. Here the very vitals of the house are located, so to speak; and its whole interior economy is likely to suffer if the basement is not as it should be.

For a good many years, ever since the basement began to develop from a sort of unused, dark and damp cellar into what it is to-day, architects and builders practically ignored this part of the house, so far as giving it any real thought and care. Nowadays, however, successful designers of comfortable homes understand very well that the story below grade deserves as much attention as the floors above, and are acting accordingly. As a consequence houses built under these designs have basements which are convenient and contribute materially to the well-being and comfort of the owners.

The man who is designing a basement would do well to approach the matter in precisely the same spirit as if he were going to live in the house himself; and this will usually bring out in his mind just those things of which he should take thought, for the good of those for whom the house is being built. He should arrange the equipment and the space in such a way as to serve best the purposes for which they are intended. This done, there is nothing left save to draw the plans.



The Basement of the Modern Dwelling

Curiously enough, most of the more obvious errors—at least, they would seem to be obvious—which are committed in the basement center around the space provided for storing the coal supply. This is entitled to the adjective "curious" for the reason that the furnace is the first and most essential thing placed in the basement. It might be said to be the sole reason for the existence of a good many basements; and yet no care is used, in many cases, in its location.

In a certain large and expensive house built in the suburbs of an Ohio Valley city there is a large, roomy basement, amply equipped in every respect, as far as material is concerned. It has a big furnace, which does good work, as furnaces go; and it has a coal bin, with a ceiling-high brick wall separating it from the rest of the space, which is large enough to hold half a season's coal supply for the house. But there is one inexplicable error in connection with the placing of the furnace which is certain to excite the anger of anybody who has to shovel coal into it.

The door of this furnace faces to the north, about 6 ft. from the steps leading to the first floor. This coal bin, on the other hand, is directly to the west of the furnace, or it might be called a little to the southwest, the brick outside wall being about on a line with the furnace door.

This means that every shovelful of coal has to be carried, not merely swung, some 8 or 10 ft., at least, when the bin is freshly filled, in order to get it around to the furnace door. And, of course, as the supply of coal gets lower, the pile retreating toward the back wall of the bin, this distance increases.

Another point worth attention, in this same house, is that the steps from the first floor are so steep that their descent is a matter for a mountain climber, equipped with alpenstock and spiked boots. The fact that the furnace is right at the foot of these stairs was given by the builder as the reason for this; but he did not explain why the furnace could not have been placed a few feet away, in some other direction, in order to make the basement stairs something more than an extremely uncomfortable ladder.

Aside from these matters, this basement is very satisfactory. It has a space partitioned off in one corner for the storage of preserves and the like. It has a servant's toilet, and an outside entrance; and, of course, it has an electric light which can be turned on from the entrance to the stairs, on the first floor—this being one of the elementary conveniences which are not often overlooked, even by the most careless designers of modern homes.

In common with most houses, however, large or small, the house referred to was built without reference to the delivery of the winter's supply of coal. The window into the coal bin is framed with wood, just like the other windows, and while it is only about 6 in. above grade—an unusually good point—the way it suffers when colored drivers shovel lump coal through it is heart-rending.

Provision for Putting in Coal

"I don't find one house in fifty," said a coal dealer in the city referred to recently, "where the architect gave the slightest consideration to the fact that coal must be placed in the basement, from any practical standpoint. Of course, there is the basement, and there is a window to shoot the coal through; but there is no effort to make it as easy as possible to handle this work.

"In many cases the window is anywhere from 16 in. to 2 ft. above grade, making a very perceptible lift necessary in order to get the coal through; and in most cases, also, the window frame is of wood, nicely painted, so that by the time a ton or so of coal has been put through it, what with the weight and size of the lumps and the gashes made by the shovel, as well as the tendency of soft coal to rub off, such a window is a sight to be wept over.

"Some architects, with the idea of taking care of this point, provide for, and have inserted, a cast-iron trap-door chute effect, intended for small-sized hard coal, and think that they have made the delivery of fuel a work of delight. But this is a soft coal country; and whereas nut or egg-size anthracite doubtless goes through such an opening with ease, it is all but impossible for a man to shovel lumps of soft coal into it at all. These are a few of the things which make me desire frequently to give some of our architects a few short lectures on the way a basement should be designed."

A successful builder of comfortable homes in Louisville, Ky., Hugh L. Nevin, whose bungalows are admirably designed, both within and without, uses the Majestic coal chute in all his houses, this device being so arranged as to swing out when the door on the outside is opened, forming a chute which protects the sill and delivers the coal.

A Well Arranged Basement

One of Mr. Nevin's basement designs, reproduced herewith, shows an admirable arrangement of the equipment which is now being placed in the average up-to-date house, intended to make all work necessarily handled in this part of the house as convenient as possible, as well as to render the rest of the house comfortable, insofar as it is affected by the basement.

The underground air-duct for the furnace is a feature not always found. This ventilation duct has its opening in a small chamber partitioned off to itself, the air entering through one of the basement windows, which opens into this chamber. A screen between the window and the duct opening filters the air of dust and dirt; and thence the conduit goes underground to the furnace.

The fuel room has partitions extending to the ceiling, and the ceiling is plastered tight, in order to prevent the inevitable coal-dust, which arises in any fuel room, but which is particularly bad where soft coal is used, as is generally the case in Louisville, from rising to the floor above, and thus penetrating the flooring, making a constant and disagreeable dirt in the room located above the bin.

In many Nevin houses the partitions of the coal bin are of reinforced concrete, like the basement walls, although frame partitions are the rule. The basement referred to contains, besides the usual servant's toilet, an unusual feature in the shape of a shower, which makes it unnecessary for the servants to resort to the family bath-room. The garage at the side, the entrance to which is excavated to 6 ft. below grade, is another feature unusual in houses constructed on a level lot, although basement garages are found where the rear of the house is enough lower than the front to make access easy.

Servants' Room in Garage

One end of this particular garage is to be used as a servant's room until it is required for the storage of an additional car. The ceiling is 8½ ft., which is a foot higher than that of the basement proper. This is necessary on account of the hight of an electric which is to be stored in the garage.

It goes without saying that laundry tubs should be placed near a window, in order that the operations may be handled with the advantage of as much daylight as possible; that gas should be piped to the basement, if it is used for fuel, and that adequate drainage should be provided in all separate rooms in order to prevent the accumulation of water. These and other things will be provided for by architect and builder who desires to maintain a reputation for designing and erecting livable houses.

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One Meaning of "Brick"

It is no mean testimony to the value of the first of all building materials that to call a man a "brick" is about the highest compliment we can pay him. Franklin Matthews, an American war correspondent, while stationed near Mukden, met Field Marshal Oyama, and became so impressed with his personality and excellent education that he wrote a two-hundred word cablegram home, in which, among other things, he said: "I find Marshal Oyama a brick." This was sent to the interpreter, who translated it in Japanese and sent both copies to the army censor. That afternoon Mathews was questioned by the commanding captain regarding the cablegram, and especially concerning the expression, "You are a brick." Matthews explained to him that in America when you called a man a "brick" you meant that he was a "splendid chap—fair and square, and all that." The captain smiled the Japanese smile and said: "Your interpreter was very clumsy. He translated the word 'brick' literally, making it read 'a lump of dried mud,' which puzzled me greatly. I am glad of your explanation."

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Much of the piling, wharf material, and lock gates of the Panama Canal are made of greenheart, said to be the most durable wood known for these purposes, which comes mainly from British Guiana.

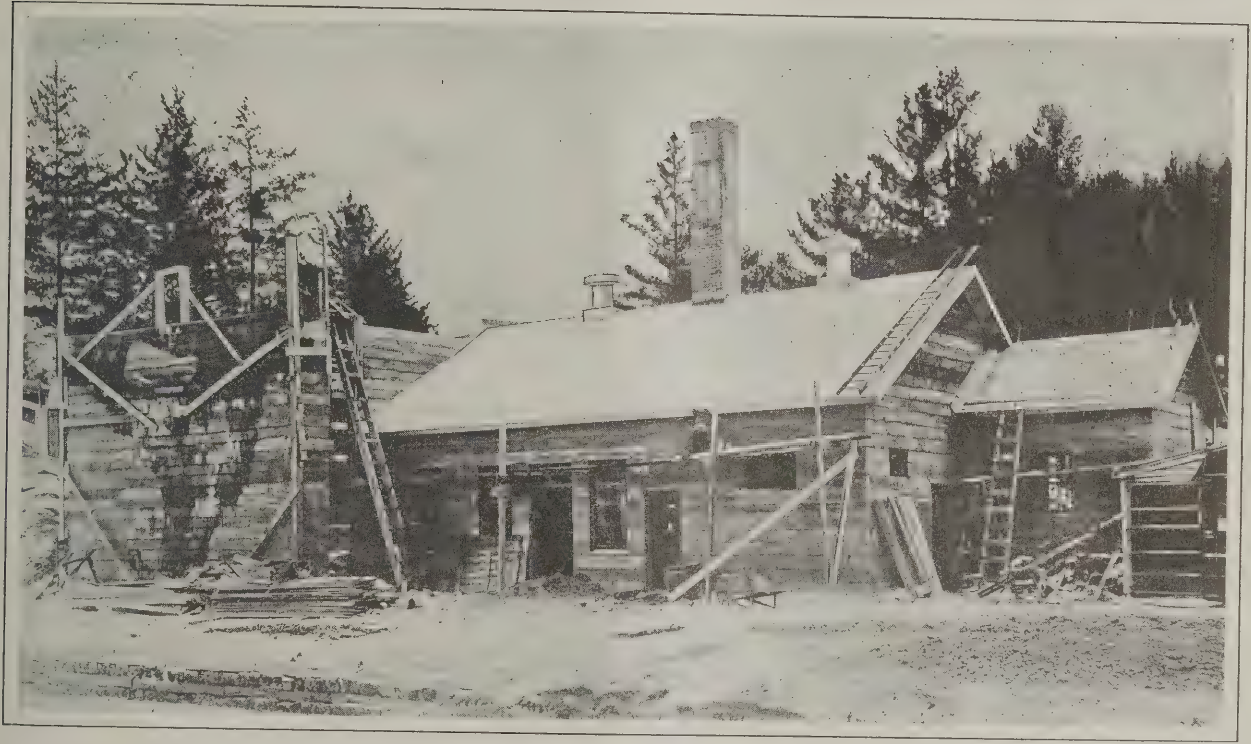
A Creamery with Hollow Concrete Walls

How Insulating Walls with a Continuous Air Space Were Constructed for a Vermont Creamery and Icehouse

WE have at intervals in the past presented to the attention of our readers various examples of hollow wall construction, pointing out the fact that walls built in this manner were good insulators of heat and cold, rendering a building warmer in winter and cooler in summer than would otherwise be the case. While the examples illustrated have been for the most part in the nature of buildings designed for dwelling purposes it must be understood that hollow wall construction is applicable to all kinds of structures both large and small and we take pleasure at this time in describing an industrial plant consisting of a creamery with icehouse adjoining on the one side and milk room and receiving shed on the other.

The buildings are those of H. B. Hood & Sons Company, of Boston, who have given the matter of sanitation and insulation a great deal of careful study, as they are constantly building small plants to meet their requirements as wholesale and retail milk dealers. Late last summer this concern lost by fire a small plant located at Boltonville, near Wells River Junction, Vt., and it was decided to replace it with buildings of concrete construction. After carefully considering the matter from various angles it was decided to erect the buildings with hollow concrete walls and with a continuous air space so as to secure the proper insulation. It was decided to adopt the Van Guilder hollow wall construction because the machines used for the work being light, could be easily and cheaply transported between their widely scattered plants and at the same time as the machines were easy to operate the necessary help could be secured locally.

In the halftone engraving presented herewith we show the general appearance of the several buildings rapidly nearing completion, the creamery in the center being more nearly finished than the icehouse which is shown directly at the left. The floor plan upon the following page clearly indicates the general arrangement. The receiving shed is shown at the extreme right, and next to it is the milk room with its platform and accessories, while beyond it in turn is the creamery proper. There is also shown the engine room with coal bin.

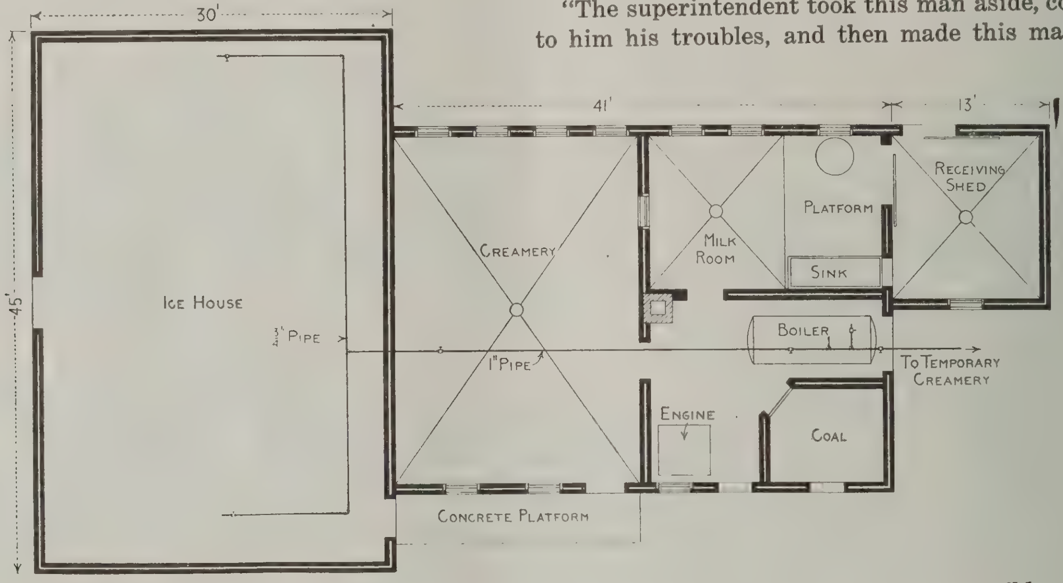

Photographic view of Creamery and Icehouse with Hollow Walls of Concrete built in Freezing Weather

The construction in this case consisted of two 4-in. concrete walls separated by an air space of 2½ in. for insulating purposes. The rebuilding was for various reasons delayed until after the first of November, and as the plant was located almost at the base of the White Mountains the builders were considerably perplexed as to how to keep the thin walls from freezing and as to whether they would "set" fast enough to allow continuous work with the wall machines referred to above.

As the buildings consist of an icehouse 30 x 45 ft. in plan, with 19-ft. walls, a creamery 41 x 30 ft., and a receiving shed 13 x 15 ft., with 12-ft. walls, there was a rather large exposed area to be protected. However, C. D. Gilbert, representative of the makers of the hollow wall machines, was equal to the emergency. There was a boiler on the premises that had been in the burned creamery and this suggested to Mr. Gilbert that steam might be turned into the continuous air space and the walls steam-cured. There was an ample supply of old pipe conveniently at hand and lines were run so as to reach every part of the building by means of steam hose connected to the walls. As fast as built the walls were covered with strips of tar paper weighted with boards and steam was turned on with the result that the concrete "set" in about three hours sufficient to allow another course to be laid and was past all danger of freezing in six hours.

The entire walls were erected in three weeks and at one time the thermometer went as low as 20 degrees below zero and at another time there was 4 in. of snow on the ground, yet the work was carried on successfully.

The floor plan shows the temporary piping and the position of the boiler which was used for steaming the walls during the process of erection.



A Creamery with Hollow Concrete Walls—Plan Showing Position of Various Buildings—Scale 1-16 *In. to the Foot*

Undoubtedly this is a solution of the problem how to protect and cure double concrete walls in cold weather, and it should result in extending the season by several months when this type of construction work can be carried on owing to the fact that the results are positive and the cost very small. In fact, this steam curing process should give concrete its proper place among building materials where double walls are specified, as it can be used in any weather suitable for other construction work.

The machines used in erecting the buildings here shown were made by the Van Guilder Hollow Wall Company, with offices at 712 Chamber of Commerce Building, Rochester, N. Y.

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The city of Los Angeles, Cal., in seeking a building that would minimize the cost of rent for working people, has experimented with a three-room concrete cottage costing $1650.

The Building Superintendent's Tact

"When we executed our first contract in Buffalo, it was for a firm which had had considerable trouble with labor. It was anticipated that there would be a strike before the job was very far advanced. The carpenters there have a strong organization. During the early stages of this job and while but a few carpenters were on it, the superintendent could give them considerable personal attention and things went smoothly. As soon, however, as work began on the second floor, where they could not be so easily seen, and at a time when the superintendent was too busy with other matters to watch them closely, unit costs began to climb day by day," said Leonard C. Wason, president of the Aberthaw Construction Co., in a paper read before the Boston Society of Civil Engineers. "By the time 'form' work was starting on the third story, he became convinced that the union steward of the job was to blame and was holding the men back from doing their best. The natural impulse would have been to discharge him immediately, but that would have made hard feeling with the union.

"The superintendent took this man aside, confided to him his troubles, and then made this man sub-foreman, with entire charge of erecting forms for columns, which was the particular item showing the highest cost. Immediately the costs came down and on the fourth story were the lowest on the whole job. In this way a thoroughly first-class workman was saved to the job, while the superintendent at the same time kept in the good graces of the local organization. Such tact and forbearance is frequently demanded of building superintendents and the right man is usually equal to the situation."

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Among the building improvements which are under way in Clark Town, W. Va., are a $15,000 brick dwelling for A. Catzen, a $7,000 brick business building for L. C. Austin & Co. and a $5,000 brick business house for R. J. Staton. The contracts for the work have been awarded to Wiggins Bros., of Northfork, W. Va.

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The making of bricks in Changchow, China, constitutes a large industry for the natives.

New Publications

Colonial Architecture for Those About to Build.—By Herbert C. Wise and H. Ferdinand Beidleman; 270 pages; size 7 x 10 in. Profusely illustrated with 207 half-tone cuts. Bound in cloth. Published by J. B. Lippincott Company. Price, $5.

The avowed purpose of this work is indicated in the title, which is amplified in the subheading by the statement that the book contains the "best examples, domestic, municipal and institutional, in Pennsylvania, New Jersey and Delaware, with observations on the local building art of the eighteenth century." While there can be no doubt of the value of the work from this standpoint, the intelligent builder and architect will recognize in the illustrations a historical value and interest which is greatly increased by the well-selected comment in the text. It must not be inferred, however, that the authors digress. As the scope of the work is architectural, the text is confined to the buildings themselves, and to those buildings which posses sufficient architectural character to contribute to the colonial style. One of the most interesting structures illustrated is that of Carpenters' Hall, Philadelphia, built in 1770, and, as the subject is of such evident interest to architects and builders, a considerable amount of matter is incorporated relative to the "Carpenters' Company," which, for nearly two centuries has preserved the worthy traditions of the builders' art in Philadelphia. That the question of price cutting was as live an issue in colonial days as at the present time is shown in the following paragraph from the historical sketch of the Carpenters' Company given in the book: "The effort to determine upon an equitable scale of prices for carpenters' work resulted in the 'Book of Prices.' This was the *vade mecum* of each member. To him it was loaned by the company. It was bound in calf, embellished with somewhat crude drawings of simple architectural details reproduced from steel or copper plates, and under the beautiful engraved arms of the company within the first cover was inscribed the name of the member to whom the volume was intrusted on condition that it should not pass from his hands. The copy beside us bears the date of 1786 and was lent to one Thomas Nevell. First appears a list of one hundred and thirty-three 'names of the Carpenters' Company of Philadelphia, sixty-three being designated as then deceased. Next to be read is an introduction that presents the carpenters' side of the case concerning building undertakings of the day, and which sounds very like arguments of modern craftsmen and latter day plaints of the 'high cost of living.' After calling attention to the 'difference between certain edifices that have been erected in and near the said city (Philadelphia) within these last few years and those plain, simple buildings which were erected in the early times of this state, to serve the necessary purpose of life,' it declares that buildings of convenience succeeded those in proportion as the inhabitants grew more opulent, and strangers from time to time arrived from other countries, where many elegancies were in use; thus such improvements were made in the mode of building as made it necessary to alter the method of measuring, or raise the price of different parts of work in the same house, that the carpenter might be paid for his labor."

Architectural Drafting.—By A. Benton Greenberg, B. A.; 110 pages; 8 x 10½ in.; numerous line cuts; bound in cloth; published by John Wiley & Sons, Inc. Price, $1.50 net.

This book attempts to embody some of the essential principles of architectural design in a work intended primarily to prepare the student of mechanical and free-hand drawing to hold a position as draftsman in an architect's office, and, as it also attempts to cover some important details of building construction, the amount of information to be gained on any particular subject is necessarily somewhat limited. The first three sections of the work are devoted to drafting implements, theory and practice of drafting, and materials of construction, after which the subject of building construction is treated, and the student is then led into a consideration of the principles of architectural design. The work is completed by a discussion of specifications and a chapter on estimating.

The following paragraph is taken from the section on specifications: "Specifications should cover in a clear and explicit manner every point not included in the plans. Nothing should be taken for granted and no loop hole left for the substitution of inferior materials or make-shifts in construction."

It would seem that, if the student should acquire from this source such information as would enable him to draw a set of specifications which would accomplish the result suggested, the book will have a wider sale than would be indicated from the modest claim embodied in the preface.

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Forestry Building at Syracuse University

The plans have now been completed by the office of the New York State Architect at Albany for the new Forestry Building at Syracuse, this being the first building of its character to be designated and erected as such by the state of New York.

The structure has been developed with the idea of making it the most thoroughly equipped building of its kind in the country for the teaching of applied forestry. It will be 282 ft. long, 64 ft. wide, three stories in hight and constructed of Indiana sandstone. Especial attention has been given to the development of laboratories for timber testing and it is expected that these will be to the eastern lumbermen and wood users what the United States Forest Service Timber Laboratories at Madison, Wis., are to the west.

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Production of Portland Cement in 1913

According to returns received by the United States Geological Survey up to January 12, the quantity of Portland cement made in the United States in 1913 was approximately 92,406,000 barrels compared with 82,438,096 barrels in 1912. The estimated shipments of cement in 1913 were 88,853,000 barrels compared with 85,012,556 barrels in the year 1912.

Some Tools for the Building Mechanic

Description of a Few of the Many Tools of Which the Carpenter Makes Use in His Business

IT is a well-recognized fact the world over that in order to accomplish satisfactory work the clever and ambitious mechanic in whatever line of trade he may be engaged must possess an up-to-date "kit" of tools and understand thoroughly how to use them to the best advantage. He must also fully realize that he can do good work only by keeping his tools in proper condition and seeing to it always that they are keen and sharp of edge. While appreciating all this he is naturally interested in the new devices and appliances which are constantly being brought out by enterprising manufacturers and from these he selects those which are especially adapted to meet his individual requirements, considering of course the line of work in which he is engaged. A first-class "kit" of tools at the present day covers a rather wide range, although with the improvements which are constantly being made and the combination devices that are available the "kit" need not necessarily be numerically as large as was the case many years ago. With a view to bringing them to the attention of our readers, the salient features of a few of the many tools of which the carpenter and builder frequently makes use in his business are briefly described in what follows:

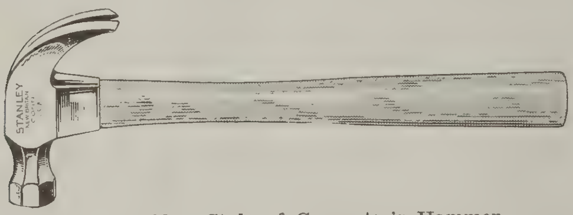


Fig. 1—New Style of Carpenter's Hammer

One of the latest additions made to the many lines of hammers now before the trade is that illustrated in Fig. 1. It has a head of special steel, carefully forged, hardened and toughened, an octagonal neck, a handle of second-growth white hickory, an octagonal poll and is fully nickel plated. The improved method of fastening the head to the handle makes it practically impossible for the head to fly off. The claws are of uniform thickness and so formed that they will grip and hold fast at any point of the shank, all sizes and kinds of nails, thus enabling the mechanic to draw them from the toughest wood even where the head of the nail has been broken off. This hammer is made by the Stanley Rule & Level Company, New Britain, Conn., who are offering it in four sizes ranging in weight from 7 to 20 oz., and in length from 12 to 13½ in. extreme outside measurement.

The same company has just brought out a new bricklayer's hammer, illustrated in Fig. 2. It is made both in adze and plain patterns and has the cutting edge of the head specially sharpened and tempered. This hammer is made in four weights, but all of the same length of handle.

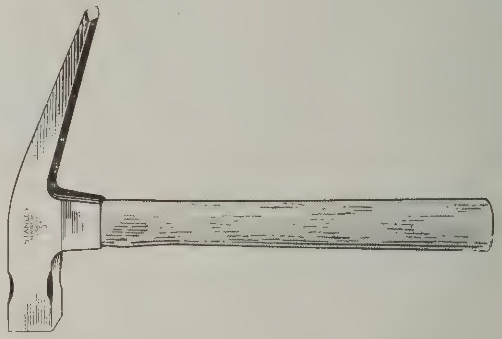


Fig. 2—A New Bricklayer's Hammer

Important adjuncts of the "kit" of tools of the up-to-date mechanic are various kinds of planes and in Fig. 3 is shown one likely to interest him. It is a combined right and left-hand adjustable rabbet plane, and the mechanic will find it useful for side rabbeting and for trimming moldings, dadoes, and grooves of all kinds. The arrangement of parts is such that by removing the mouthpiece the carpenter can work close in corners. It is made by Sargent & Co., 1153 Leonard street, New York City, which concern has also just brought out the adjustable iron bench plane shown in Fig. 4. This has an East India mahogany handle and knob and polished trimmings. It is made with both smooth and corrugated bottom and has a 2-in. Sheffield steel cutter which is extra heavy and requires no cap, as the clamp acts as a breaker for the chip. The clamp has a regulating screw, by means of which the clamp is always set at just the same position after having removed it to grind the cutter. It may be so adjusted as to give a fine or a coarse cut, according to requirements. The plane is especially adapted for working against the grain on coarse grained hardwood where the rigidity of

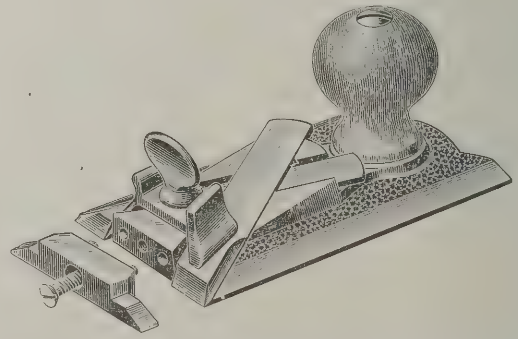
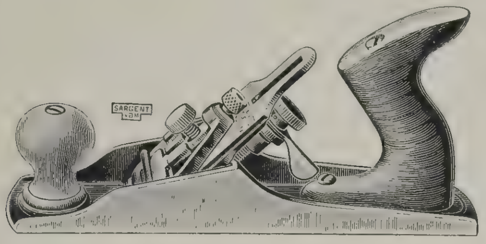


Fig. 3—A Combined Right and Left Hand Adjustable Rabbet Plane

the cutter avoids any tendency to "chatter."

One of the important developments in the way of a device for readily mortising doors for locks is the machine illustrated in Fig. 5. It is particularly intended for use where a large number of doors have to be mortised, as for example in office buildings, hotels, hospitals, etc., and is a great time saver for the carpenter-contractor or the builder having in the course of the season a great many doors to mortise. The device, which is known as the Pittsburgh lock mortiser, is an automatic self-feeding machine having right and left clamp screws which render it self-centering. It also has machine cut gears which insure easy operation. It will cut a mortise from ⅝ in. to 1⅜ in. wide, 4¾ in. deep and 6 in. long. The cutters are made of a high grade of tool steel specially treated for the use of woodworking machinery. It is made by the Pittsburgh Instrument & Machine Company, 236 Third avenue, Pittsburgh, Pa., who makes the claim that it will cut an opening for a mortise lock in a door in a very few minutes. It will develop a speed of 1200 revolutions per minute and give a much better job than a man can do with bit and chisel.



Some Tools for the Building Mechanic--Fig. 4—An Adjustable Iron Bench Plane

The hack hand saw is as yet a comparatively new proposition, but it is coming into favor among carpenters and builders and they are, therefore, likely to be interested in a tool of this kind which has just been put out by the Simonds Mfg. Company, Fitchburg, Mass. The mechanics are finding many uses for a tool of this kind, such for example as cutting nails, finishing a cut where nails must be sawed through, cutting pieces of sheet metal, etc., all of which helps to save the regular hand saw and expedites the carpenters and builders work. The hack hand saw has the advantage of an adjustable handle which permits the use of the saw with the blade turned to any desired angle, as indicated in Fig. 6. This often means that a carpenter can saw with the hack hand saw in some place difficult of ready access where a regular hack saw or a hand saw would be useless. The blade is made of Simonds steel with special patented high temper for cutting nails, etc., and it is taper-ground for clearance. The carved and highly polished adjustable apple handle makes the saw not only strong in this particular but also of neat appearance. With the diversity of work which the present day carpenter is called upon to do, and the rush with which it is usually executed, a saw of the nature indicated is a necessary part of his equipment.

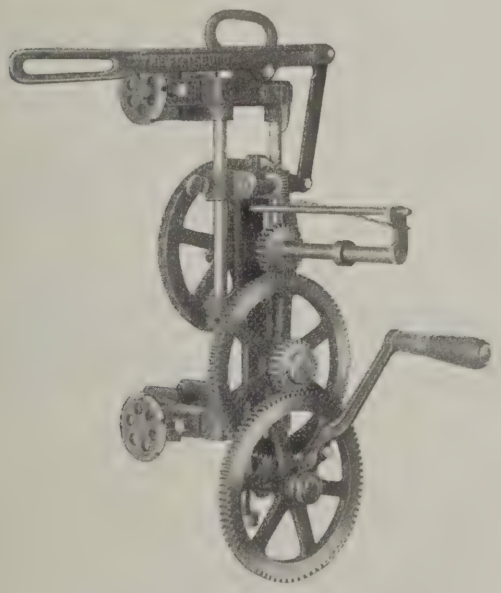


Fig. 5—The Pittsburgh Lock Mortiser

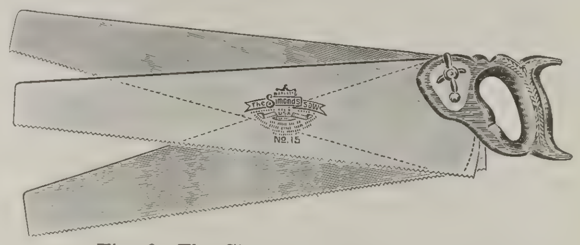


Fig. 6—The Simonds Hack Hand Saw

It goes without saying that the bit brace finds a place in the carpenter's "kit," and a style which embodies interesting features is the "Precision" made by the Russell Jennings Mfg. Company, Chester, Conn. It is being offered in two grades, one having ball bearing head, vulcanized fiber grip and head and enclosed ratchet, while the other has a stained wood grip and head and open ratchet. In Fig. 7 is shown the chuck used with the bit brace, and is especially designed to take only the "Precision" shank. A portion of the outer casing is broken away, clearly indicating the internal mechanism. The split bushing fits the turned shank of the bit, which has a slight reverse taper that prevents the shank which is firmly gripped from pulling out. The bit cannot turn in the chuck because the slotted shank fits over the plate in the bottom of the chuck.

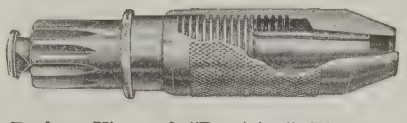
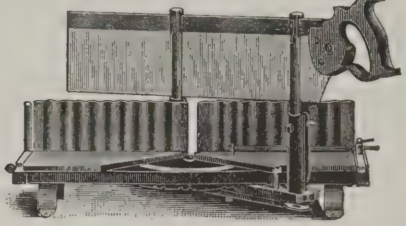


Fig. 7—Broken View of "Precision" Bit Brace Chuck Showing Internal Mechanism

In placing on the market the steel miter box illustrated in Fig. 8 the manufacturer had in mind the hard usage which such a tool meets in the shop, on the job and on its numerous trips from place to place. The belief was firmly held that cast iron from its brittle nature and great liability to break was entirely unsuited for the purpose, although the wearing qualities might be somewhat the same. In making its new miter box of steel, therefore, the Goodell Mfg. Company, Greenfield, Mass., has brought out a tool well calculated to meet the needs of the carpenter and the cabinet maker. The liability to breakage is obviated and durability is insured. The box is designed to be used at any regular or special angle, and when two opposite cuts are wanted the graduation is such that the tool can be readily adjusted to cut them. The saw is held up by automatic stops, thus allowing the operator to use both hands in placing the work in position.


Some Tools for the Building Mechanic—Fig. 8—General View of the Goodell Steel Miter Box

There are many occasions when the mechanic finds it desirable to have conveniently at hand a combination tool adapted for doing a great variety of small work, and to meet such requirements the Bergman Tool Mfg. Company, 1575 Niagara street, Buffalo, N. Y., has brought out the combination tool handle and pin vise which we illustrate in Fig. 9. It is constructed entirely of metal, is highly finished in nickel and is indestructible. The handle is hollow and the cap shown at the left in the picture unscrews, revealing ten tools, the various uses of which are indicated in the illustration. These tools are of forged steel with all parts tempered, and the outfit constitutes a practical tool for mechanics in general. It is also adapted for use as an end tap wrench as well as pin vise. By means of the milled nut shown at the right-hand end of the tool the jaws of the pin vise or wrench, as the case may be, are opened, and any one of the tools shown may be inserted, then by turning up the nut it is held securely in place. The combination affair found decidedly convenient for use about the house and at the same time constitutes an important adjunct of a mechanic's outfit or "kit" of up-to-date tools.

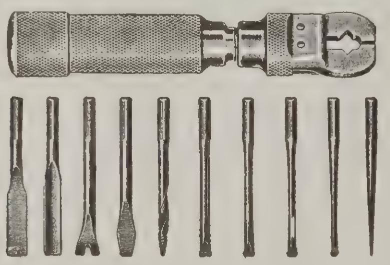


Fig. 9—The Bergman Combination Tool, Showing Contents of the Hollow Handle

The automatic boring tool shown in Fig. 10 of the accompanying illustrations is one of the recent additions to the line of tools manufactured by the Millers Falls Co., 28 Warren street, New York City, and Millers Falls, Mass. This tool is fitted with a chuck holding round shank drill bits up to ¼ in. in diameter and is provided with a knurled chuck nut immediately back of the chuck to prevent the latter from working loose. This is made with a cocobolo handle and all metal parts are polished and nickeled. The boring tool is 11¾ in. long and the weight per dozen, with pasteboard box, in which it is packed, is 9½ lb.

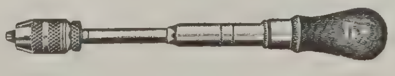


Fig. 10—Automatic Boring Tool

The carpenter frequently has use for an auger bit, and in his "kit" of tools several varieties are usually to be found. A bit which is claimed to do almost anything in the boring line that may be required is that illustrated in Fig. 11. It is known under the trade name of "Mephisto," and is made by the W. A. Ives Mfg. Company, Wallingford, Conn. The "Mephisto" is constructed with floor lip and one side spur so as to give the least possible friction and the operator may take off one solid chip if he so desires instead of doing it in the form of two shavings. The floor lip is a continuation of the last thread of the worm and the side spur is on the side opposite the worm so that the bit is balanced and will bore true and smooth, pulling itself into the wood without pressure on the brace. The point is made that the bit can be easily filed by even a novice and with a single floor lip filed convex, concave or perfectly true, will lift the chip properly, as it has no opposite floor lip with which it must work in cutting out shavings.

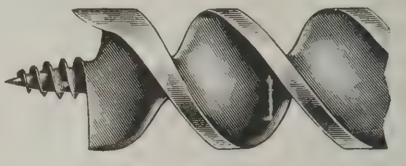
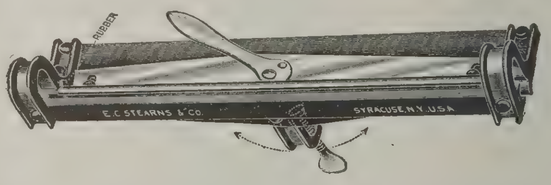
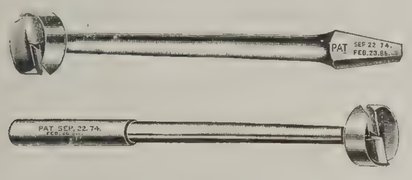


Fig. 11—"Mephisto" Auger Bit

A device which the mechanic will find exceedingly convenient when filing and setting saws is the folding vise illustrated in Fig. 12. It is made of sheet and channel steel finished in black Japan baked on. The rear jaw is faced with rubber which is said to prevent vibration and renders the filing of saws in this vise practically noiseless. The lever is below the top of the vise on the rear jaw and is, therefore, entirely out of the way. The parts of this folding steel saw vise which are not Japanned are nickel plated. E. C. Stearns & Co., Syracuse, N. Y., manufacturers of this vise, state that its extreme length is 12 in., the length of the jaw is 10½ in., and the width 2¾ in., while the weight is only 2 lb. 10¾ oz.


RUBBER
E.C. STEARNS & CO.
SYRACUSE N.Y. U.S.A.
Fig. 12—General View of the Stearns Folding Saw Vise

There is a form of auger bit upon the market which the carpenter, the cabinet maker, the general woodworker and pattern maker finds of great utility by reason of its labor-saving features. It is known as the Forstner bit, and is particularly adapted for working in hard wood. This bit is guided by its circular rim instead of its center. Therefore, it will bore any arc of a circle and can be guided in any direction regardless of grain or knots. The point is made that this bit is more expeditious than chisel, gouge, scroll-saw or lathe tool for core boxes or for working fine and delicate patterns, veneers, screen work, fancy scroll twist columns, newels, ribbon molding, scalloping, etc. It is made by the Progressive Mfg. Company, Torrington, Conn., and in Fig. 13 we show a general view of the brace bit and also of the machine bit made by them. In order to bore an angle or an arc the bit is held near the flange firmly upon the wood with the thumb over the shank and the fingers underneath the board or block, care being taken not to crowd the bit too fast at first until the flange is in the wood in its desired course.



Some Tools for the Building Mechanic—Fig. 13—Views of the Forstner Brace and Machine Bits

A carpenter's hammer recently placed on the market is provided with a device for holding the nail so as to start driving at a point which cannot be conveniently reached in the old way; that is, with the nail between the thumb and finger of one hand and driving with the hammer in the other hand, is illustrated in Fig. 14. It is known as the "Hynaler" hammer, and it is so made that it will grip the plain part of a nail and pull the head clear through the wood if such a procedure should be found necessary. The engraving shows the head of the hammer with a nail in position for driving, whether it be at a point high up, low down or far across. The head of the hammer weighs 16 oz. It is made by the Double Claw Hammer Company, 453 Broadway, Brooklyn, N. Y., which concern is also offering a double claw hammer of such construction as to draw a nail straight out without using a block under the head. This hammer also holds the nail in its claws for starting to drive at any point and the claim is made that with it a nail can be driven even faster than with a single claw hammer weight for weight and blow for blow.

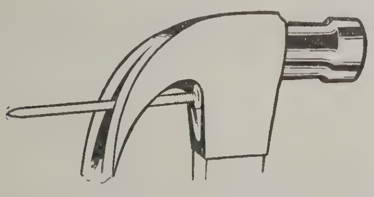


Fig. 14—The "Hynaler" Hammer with Nail in Jaws Ready for Driving

A new device of special interest to the carpenter, consisting as it does of a combination gauge for quickly and accurately mounting butts and locks in door frames and jambs, is the Atkins mounting tool illustrated in Figs. 15 and 16. The former shows the tool in use for cutting for butts on a door. By turning the handle to the left the markers are loosened on the gauge rod so that they may be set at any desired point. The small scratch point on the end of the shaft takes the thickness of the butt in the wood. In gauging and cutting a rabbeted jamb for a butt the gauge plate being 1/16 in. thick gives the necessary clearance between the door and frame or stop. As each blade has two cutting edges the tool can be operated by drawing it up or down as desired. The handle of the tool is finely finished, all metal parts being nickel plated and buffed. The length of the gauge rod is 2⅛ in.; the extreme length of the gauge is 6 in. and the weight is 5½ oz. It is made by E. C. Atkins & Co., Indianapolis, Ind. In Fig. 16 the tool is shown in use for mounting a lock, the markers being sharp will not only gauge but cut to the desired depth when in use in ordinary wood.

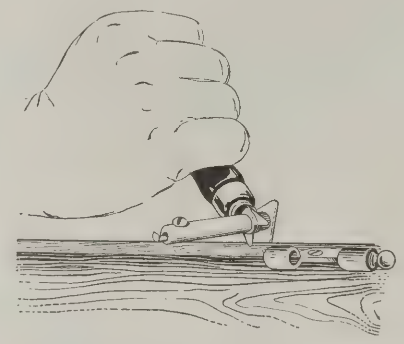


Fig. 15—The Atkins Mounting Tool as it Appears When in Use for Cutting for Door Butts

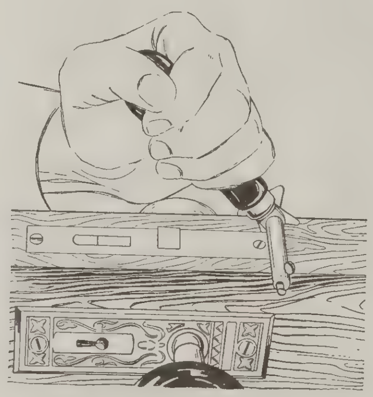
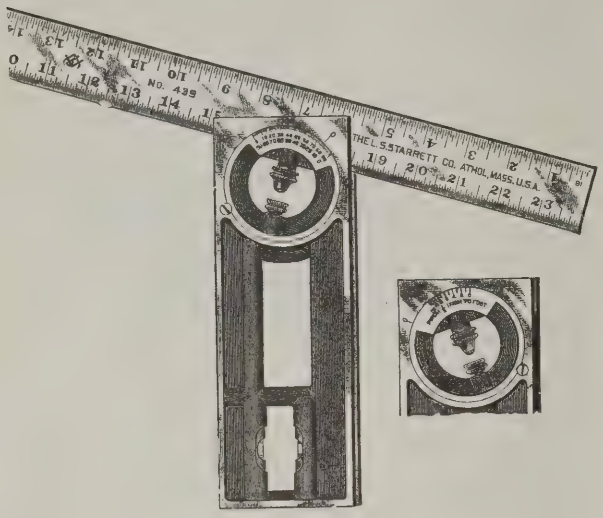


Fig. 16—The Tool in Use for Mounting a Door Lock

Another tool which is usually found in the "kit" of tools of the present-day carpenter and builder is the device illustrated in Fig. 17. It is in effect a combination of seven ordinary tools, consisting of rule, square, level, protractor, bevel, plumb and pitch-to-foot indicator. It consists of a stock 9 in. long with sliding blade 18 or 24 in. in length and 1½ in. in width. The blade is adjustable through the revolving turret in the stock which is graduated on one side in degrees with two rows of figures reading either right or left, and on the other side is graduated to show the pitch to the foot, the graduations indicating a ½-in. pitch. This combination tool is also adapted for laying out or cutting for valleys or hips of different pitch, for setting braces at desired angles and in connection with all sorts of framing problems. It is made by L. S. Starrett Company, Athol, Mass., who states that after using the tool a short time carpenters will find it convenient in laying out many kinds of complicated work which otherwise would require considerable calculation.



Some Tools for the Building Mechanic—Fig. 17—The Starrett Combination Tool

Those who have occasion to frequently make use of a hack saw will be interested in the new pattern known as No. 175½, which has just been placed on the market by C. E. Jennings & Co., 71 and 73 Murray street, New York City, and is illustrated in Fig. 18. This frame is finely nickel plated and takes blades ranging from 8 to 12 in. in length. The handle is of the improved type and is said to give the user a more perfect purchase than before so that the operator can work to greater advantage with more speed and less chance of breaking the blades than with the ordinary frame. The handle is of wood and so adjusted that the saw will at all times saw to the center of the work.

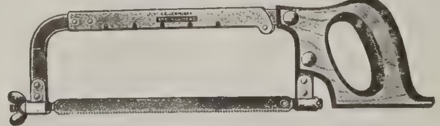


Fig. 18—View of the New Jennings Hack Saw

In what is known as the Ford Single Lip Auger Bit, illustrated in Fig. 19, the carpenter finds an adjunct of his "kit" of tools for which strong claims are made. The bits are tempered by a patented process which makes them all uniform and each bit is tested in hard hickory and carefully inspected before being sent out. The claim is made that it will not turn off when boring against the sides of knots or across season cracks, and when necessary to bore at a very slight inclination to the grain it will not follow the latter but will bore perfectly straight. In boring two or more thicknesses of wood it does not, on leaving each piece, cut what is known as a "button," but bores as if in solid timber. Another point emphasized by the makers, the Ford Auger Bit Co., Holyoke, Mass., is that it cuts out with such slight splintering that the user can bore straight through all kinds of wood, saving two or more turns on every piece.

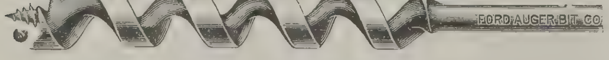


Fig. 19—The Ford Single Lip Auger Bit

One of the most important tools which the carpenter has to use is a saw, for upon its quality depends the satisfaction with which the work in hand may be done. A tool of this kind which is meeting with much favor in the trade is that illustrated in Fig. 20 and known as the "Vanadium," by reason of the fact that it is made from Vanadium high-speed steel, hardened and tempered by a secret process. It has a highly polished blade, extra thin back and carved handle which is held in place by four improved brass screws. This tool is intended for a wood saw only, and is said to contain in perfect combination those important saw qualities—"density," "elasticity" and "ductility." Such a saw will permit its blade to be wound very much like a watch spring, yet will not kink when freed or left loose. Again it will permit the user to drive the teeth at right angles to the blade and not break and at the same time it will permit of easy sharpening, filing and setting. It is made by the Pennsylvania Saw Company, Betz Building, Philadelphia, Pa., and with factory at Frackville, Pa. It is furnished with straight or skew back and in hand, panel, ship carpenter or rip pattern. It is made with any teeth desired and in lengths ranging from 16 in. for the smallest up to 30 in. for the largest size. The saw is said to represent the highest attainment of sawsmiths' art and special reference is made to its hang and its cutting qualities and to the fact that on every blade a binding guarantee is etched.

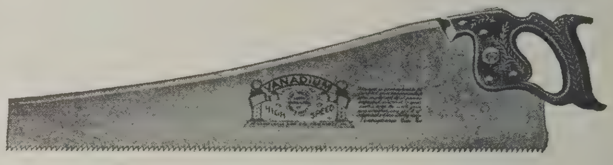


Fig. 20—Side View of the High Speed "Vanadium" Steel Saw

Something new in the way of an automatic drill is illustrated in Fig. 21, which shows one of the tools brought out by the Goodell-Pratt Company, Greenfield, Mass. This tool has a finely knurled handle the entire length, thus giving a firm grip, and in addition to possessing the general characteristics of the company's other automatic drills has a most valuable feature in the shape of a drill point gauge. This latter is in the form of holes drilled in the handle just under the rotating cap, all as shown in the illustration. There are eight of these gauges and they correspond in diameter to the eight drill points contained in the handle. The value of this feature lies in the fact that the user can at a glance determine just which size drill point to use in order to drill a certain hole and at the same time to see how large a hole a

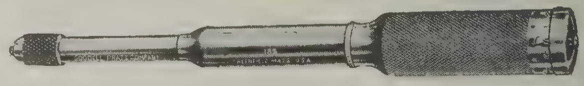
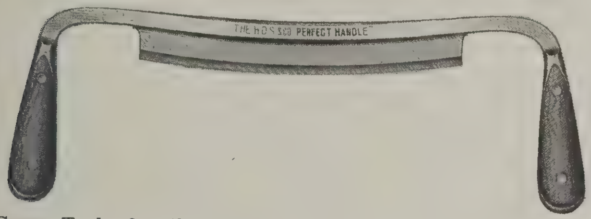


Fig. 21—General View of the Goodell-Pratt Automatic Drill No. 185

particular drill point will bore. The drill is also equipped with eight fluted shank drill points which, when properly fastened in the chuck, cannot be pulled out. The drill points vary in size from 1/16 in. to 11/64 in. The drill itself without any points is 10 in. long and weighs 10½ oz. It is fully polished and nickel plated.

No carpenter's kit is complete without a drawing knife and the mechanic who wants to do good work will be interested in the style illustrated in Fig. 22, which is equipped with what is known as the "Perfect Handle." This has a narrow piece of steel for a cutting edge welded to a piece of iron and has hollow round wooden handles pushed over slender spike or tang ends. The knife has a solid crucible steel blade which, it is pointed out, can be used to the very back. The knife is made by H. D. Smith & Co., Plantsville, Conn., and is offered in three sizes of blade—8 in., 10 in. and 12 in.



Some Tools for the Building Mechanic—Fig. 22—View of "Perfect Handle" Drawing Knife

A flooring saw which was originated and mathematically calculated for sawing openings in floors, siding, partitions and sheathing, is illustrated in Fig. 23. It is of special interest to carpenters having occasion to do much repairing and remodeling work, owing to the fact that it is a saver of time and also of material in connection with the work indicated. The curved cutting edge with the company's patent adjustable handle allows full advantage for long or short strokes. The dotted lines in the illustration show how the position of the handle may be varied. George H. Bishop & Co., Lawrenceburg, Ind., maker of the saw, calls attention to the fact that with this blade an opening can be sawed in a floor or in the side of a house without first boring and starting with a compass saw as is usually the method employed. The back tooth edge enables sawing to be done close to a wall as well as in corners. The saw is 18 in. long and there are 11 points to the inch.

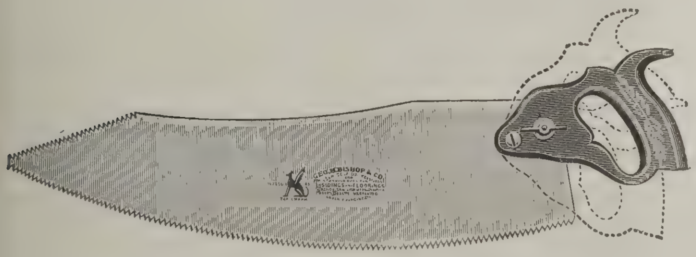


Fig. 23—The Bishop Flooring Saw

A saw which is well adapted for miter cutting and which represents the results of a great deal of time, labor and expense in its development has recently been placed on the market by the Rockford Miter Box Company, Rockford, Ill. The saw is ground from a plate of steel equal to the thickness of the "set" of an ordinary miter box saw; then reduced to the standard size so as to fit the saw guides, leaving ½ in. at the cutting edge—the same amount as a set saw—as shown in Fig. 24. Some claim that a saw cannot be set as accurately as it can be ground, therefore it will push harder, rendering it more difficult to cut true and will not leave a smooth cut, but the new saw here illustrated is said to take care of all these troubles. Adding 3 gauges to the thickness of a saw blade for the first ½ in. renders it stiffer, reduces vibration and gives less opportunity for the sawdust to work up between the saw and the wood, at the same time a higher temper steel can be used. The saw is made of 20-gauge material, has 12 teeth to the inch, and while furnished in all the miter boxes turned out by the company it will fit any other standard size tool of this kind.

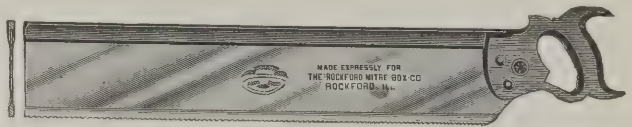


Fig. 24—The Rockford Saw for Miter Cutting

Another important adjunct of the "kit" of the present day carpenter and builder is a set of "Yankee" tools made by North Bros. Mfg. Company, Philadelphia, Pa. These embrace ratchet and spiral ratchet screw drivers and automatic drills made in styles and sizes to suit different purposes. These tools are accurately made of the best materials, all metal parts are handsomely polished and all except blades are nickel plated. The bits and drill points are made of high grade steel thoroughly tested and guaranteed. In Fig. 25 is shown a general view of a "Yankee" screwdriver with several styles of bits.

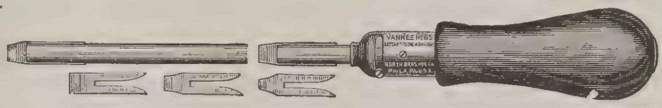


Fig. 25—The "Yankee" Screw Driver with Several Styles of Bits

A line of edge tools in which the progressive carpenter cannot fail to be interested is that offered by the L. & I. J. White Company, Buffalo, N. Y., which has had seventy-five years' experience in the business. These tools are finely tempered and every one is subject to the most rigid inspection before leaving the factory. Any tool which proves defective in material or manufacture is replaced by the company if it is returned to it, without expense. This, however, does not cover tools which show evidence of long usage or which have been damaged by misuse. Any one can drive a chisel into a piece of wood, pry on it and break it, but this does not necessarily mean that the chisel is defective. So many of what are claimed as defective are due to misuse that the company has been forced to insist that the tools be returned for inspection before replacement is made or credit allowed. This seems to be an entirely fair propo-

(*Continued on page* 80)

Annual Review of Building Situation

Figures Showing Building Activities in Leading Sections of the Country in 1913 as Contrasted with 1912

BUILDING conditions prevailing during any designated period are usually analogous to those existing in the general industrial field during the period under discussion. Considering the country as a whole, building operations for 1913 show a decided decrease as compared with those of the previous year. There are many exceptions, however, and these are not by any means confined to the smaller cities. Considering the northeastern portion of the country, it is found that New York City has suffered more severely than any other metropolis in this section with the single exception of Washington, D. C., which records a loss of 61 per cent. as compared with 1912.

Greater New York shows a loss of 34 per cent., the Borough of Manhattan having lost 36 per cent., the Bronx, 42 per cent., Brooklyn, 18 per cent., Richmond, 1 per cent. and Queens 10 per cent.

Building in Greater New York

The largest item in the list for Manhattan is that of tenement houses with an estimated total cost of over $22,000,000. The next item on the Manhattan list is that of office buildings which reaches nearly $20,000,000. In the metropolitan district of Greater New York plans were filed with a total value of $170,000,000 in 1913, as compared with a total value of $250,000,000 for 1912. Tenement houses formed the largest item in the Bronx total of $20,000,000, reaching the approximate figure of $15,000,000, during the year 1913, as compared with $26,000,000 for the previous year. The tenement total for the Borough of Brooklyn is likewise the largest item, approximating nearly $12,000,000 in a total of nearly $31,000,000.

Philadelphia reports an increase in 1913 over the figures of 1912 of 4 per cent. The increase in the figures of 1913 over 1912 is said to be due to the increased activity in the building of moving picture theaters, there being 74 of these buildings erected in 1913, while in 1912 but 15 were erected. The figures for the city of Boston, as given out by Building Commissioner Everett, show a total of $17,463,330 for the year 1913 as against the total of $21,151,341 for the twelve months of 1912, a loss of 17 per cent.

In Pittsburgh building permits issued by the Bureau of Building Inspection during the year show a gain of 39 per cent. as compared with the total for 1912. The prospects in the Steel City for 1914 are bright. No labor trouble is expected, as the Builders' Exchange has an agreement with the Building Trade Council whereby there will be no strikes or lockouts on any work, but any misunderstanding will be referred to a joint committee of these organizations for adjustment, and many building projects are under way.

Building in Boston

The report of the city of Boston is somewhat disappointing, showing a loss of 17 per cent., but this is explained by Morris Hacker, inspector of buildings for that city as follows: Operations in 1912 were rather extraordinary owing to the permit for a $3,000,000 hotel, the construction of an unusual number of large apartment houses, etc. The operations in 1913 on the other hand were abnormally below the average, a condition which seems to have been due rather to the country-wide depression in building work than to any local factor, for there are no specific reasons which may be advanced for the disparity between the two years. One other factor which may be mentioned, however, has been the falling off in the direction of speculative building; that is, dwellings built with the idea of quick sale. A healthy increase of 12 per cent. is to be noted in the case of Baltimore, which records a total of $14,053,801.80 for 1913 as against the total of $12,453,070.40 for the year 1912. In the compilation of the above figures, however, 20 per cent. is added to the actual total, for undervaluation. The city of Buffalo reports a gain of one per cent. over the figures for 1912.

NORTHEASTERN CITIES

	1913		1912	
New York ..	......	$146,009,188.00	......	$223,694,368.00
Philadelphia.	14,813	38,763,850.00	14,707	37,173,635.00
Boston	1,674	17,463,330.00	1,764	21,161,341.00
Pittsburgh .	3,461	15,470,955.00	3,871	11,137,043.00
Baltimore ..	13,322	14,053,801.80	13,412	12,463,070.40
Buffalo	3,977	13,109,380.00	4.090	12,992,000.00
Rochester ..	3,268	9,642,124.00	3,888	12,035,466.00
Washington	6,294	10,243,748.00	6,270	16,772,183.00
Hartford ...	1,169	5,784,751.00	1,277	7,379,525.00
New Haven.	1,100	4,790,151.00	1,330	4,761,311.00
Worcester ..	1,576	4,780,495.00	1,698	6,689,900.00
Utica	1,213	4,454,242.00	810	2,022,308.00
Newark	3,089	15,045,500.00	2,809	11,150,150.00
Paterson ..	660	1,476,666.00	909	2,124,403.00
Trenton	755	2,068,093.00	840	2,201,026.00
Troy	1,047	2,564,178.18	514	1,425,872.00
Altoona	.....	1,016,430.00	.....	828,406.00
Asbury Park.	430	400,915.00	513	518,725.00
Hoboken ...	214	569,340.00	215	500,602.00
Waterbury ..	572	1,945,300.00	577	1,500.000.00

Conditions in the Northcentral section of the country are materially better than those recorded in some of the Eastern cities. Chicago managed to land on the credit side with an increase of 2 per cent. over the figures of 1912. This showing on the part of the Western metropolis would undoubtedly have been still better had not labor difficulties interfered with building operations during several months of the past year, and this statement holds good for several other Northcentral cities, including Indianapolis and Cincinnati.

The city of Detroit made a very favorable showing during the year 1913 with an increase of 19 per cent. over the figures of 1912. The Cleveland building report shows an increase in the value of permits during 1913 amounting to over $5,500,000, which is mostly in the line of dwellings, manufacturing buildings and store buildings, there being no gain in the office building and apartment house columns.

Building in St. Louis

A decrease of about 26 per cent. is to be noted in the case of St. Louis, Mo., which is accounted for by the fact that, in 1912, there were two large office buildings erected aggregating a cost of $3,500,000. The city of Milwaukee lost about 10 per cent. in its total of building operations for 1913, as compared with those of the previous year, which is attributed by the inspector of buildings to the fact that, in 1912, two large buildings, the First National Bank and the Northwestern Mutual Life Insurance Co. structures were erected at a total cost of $3,600,000. Aside from this the building operations show an increase in 1913 in all classes of construction. Minneapolis building figures fell below those of the previous year by 10 per cent. and this decrease was also attributed to the issuance of several unusually large permits in 1912. Kansas City, Mo., shows a decrease of about 15 per cent. in the 1913 total, as compared with that of 1912, which is said to be due in some measure to the passage by the Missouri State Legislature of an insurance law which caused many of the insurance companies to cease doing business in the state pending negotiations, thereby reducing the volume of dwelling construction during the period. A second factor was a labor difficulty which for three of the best building months during the summer tied up practically all construction. Indianapolis, Ind., records an increase of 2 per cent. in the building total for 1913.

Cincinnati building figures show a decrease of 7 per cent. for the year, which is a favorable showing considering the adverse conditions which prevailed in that city. The year was a very unsatisfactory one from the builders' standpoint, as labor difficulties existed throughout almost the entire summer. The apparent excellent showing is due to the fact that several large buildings including the Gwynne building formed a part of this total. Reports from this city indicate that, at the present time, labor difficulties are no longer a factor, and indications point to a prosperous year.

Columbus, Ohio, records an increase of some 18 per cent. in the building total for the year, which was not due to any particular class of buildings, the increase being general in all classes of structures with the exception of the office building column, which recorded no important contracts. With nearly 400 more permits showing a value of building properties of nearly $2,000,000 more than for the year 1912, a gain of 70 per cent., during the past year in construction in Grand Rapids, Mich., has proved to be the greatest in the history of that city.

NORTHCENTRAL CITIES

	1913		1912	
Detroit	9,326	$30,434,380.00	7,992	$25,588,470.00
Cleveland	11,064	23,841,160.00	8,790	18,180,078.00
St. Louis	8,302	15,340,112.00	8,593	20,675,803.00
Milwaukee ...	4,016	13,647,624.00	4,361	15,257,162.00
Minneapolis ..	6,135	12,857,935.00	5,965	14,229,475.00
Kansas City .	3,719	10,578,162.00	4,544	12,396,338.00
Indianapolis ..	221	9,361,973.00	205	9,150,407.00
Cincinnati	12,558	8,348,432.00	11,751	8,962,214.00
Columbus	3,888	5,508,408.00	2,656	4,675,303.00
Grand Rapids	.....	4,169,000.00	1,433	2,456,946.00
Des Moines ...	709	2,139,930.00	759	1,755,759.00
Evansville	.....	1,786,503.00	.....	1,531,476.00
Davenport	377	1,428,921.00	294	1,021,620.00
Springfield ...	408	804,014.00	457	1,422,227.00
St. Louis	.....	1,021,118.00	.....	672,569.85

Of the cities of the Southern section of the country, Birmingham, Ala., made the remarkable increase of 69 per cent. The total for the past year amounted to nearly $6,500,000, an increase of $2,600,000 over the figures of 1912. Atlanta, Ga., showed a very decided decrease in the figures for 1913, recording a loss of 49 per cent. The total for the year amounted to a little over $5,000,000 as compared with nearly $10,000,000 for the previous year. Louisville, Ky., showed a decrease of nearly $2,500,000 in a total of something over $4,000,000 for the year 1913, a loss of 38 per cent. Memphis, Tenn., lost 45 per cent. and records a total for the year of $3,949,000. Jacksonville, Fla., lost nearly $1,000,000 as compared with the total for the previous year. Nashville, Tenn., however, showed an increase of nearly $300,000 over 1912 or 11 per cent.

SOUTHERN CITIES

	1913		1912	
Birmingham	4,142	$6,429,737.00	3.412	$3,813,079.00
Atlanta	3,306	5,112,944.00	3.912	9,987,444.00
Louisville	2,426	4,054,180.00	2,381	6,552,550.00
Memphis	3,363	3,949,368.00	3,657	7,162,215.00
Jacksonville	1,115	2,974,652.00	1,148	3,807,957.00
Nashville	.....	1,666,602.65	.....	1,388,243.00
Little Rock	848	1,333,422.00	899	1,535,288.00
Durham	157	543,092.00	132	328,510.00
Fort Smith	140	395,432.00	.....	....

Of the Western cities, Los Angeles leads with a total of $31,641,921, which is an increase of approximately $300,000 or 1 per cent. over the figures of 1912. The city of San Francisco, on the other hand, records a total of building operations during the year of only $21,000,000, a loss of over 10 per cent as compared with 1912. This decrease is largely due to the loss in the "Class A" column, and indicates that office building space is catching up with the demand. Portland, Ore., records a decrease of $1,695,000 or 11 per cent., as compared with the total for 1912.

WESTERN CITIES

	1913		1912	
Los Angeles ..	16,442	$31,641,921.00	16,455	$31,367,995.00
San Francisco	5,606	21,037,264.00	6,316	23,338,563.00
Portland	6,710	12,956,915.00	8,224	14,652,071.00
Seattle	9,597	9,321,115.00	9,819	8,415,325.00
Omaha	1,236	4,110,733.00	1,372	4,546,761.00
Spokane	908	3,429,235.00	1,130	2,251,792.00
Sacramento ..	.....	3,416,058.00	.....	2,793,544.83
Denver	2,034	2,797,148.00	.....	....
Tacoma	1,896	2,474,364.00	1,740	1,876,487.00
Topeka	517	928,767.00	657	944,199.00
Colo. Springs	.....	409,828.00	.....	555,704.00
Beaumont	.....	296,455.00	.....	....

Seattle rejoices in an increase of $900,000 or 11 per cent., which increase is to be credited largely to the factory, hotel and apartment building columns.

Figures covering 145 cities show an estimated outlay of $872,759,987 or a decrease of 6.3 per cent.

Current News of Builders' Exchanges

Various Meetings and Elections of Officers for the Ensuing Year—A Christmas Party

Banquet of Pittsburgh Builders' Exchange

At the banquet of the Builders' Exchange of Pittsburgh, held at the Fort Pitt Hotel on the evening of December 18 and attended by 320 representative builders of that city, some very interesting and instructive addresses were delivered. James L. Stuart, a prominent general contractor, presided as toastmaster. During the evening popular songs were sung by a quartette and in which the entire company joined, enlivening the evening and rendering the occasion one of right good fellowship. Hal H. Smith of Detroit spoke on the "Workmen's Compensation Laws" and Dr. Walther Riddle of Pittsburgh discussed interestingly on "Chemistry and the Builder." There was an illustrated specialty given by Walter H. Faulkner under the title "Ourselves as Others See Us," being a production of lantern slide cartoons of prominent members of the Pittsburgh Exchange. One of the addresses to which marked attention was given by those present was delivered by Edward A. Roberts, secretary of the Builders Exchange of Cleveland, Ohio, and copious extracts from which we present in another part of this issue.

In regard to the Exchange it may be said that much of the activity an dentuhiasm of the past six months is due to the work of its secretary and general manager, E. M. Tate, who is one of the "live wires" of the building business. Mr. Tate was formerly secretary of the Pittsburgh Master Plumbers' Association, and since he took office on June 1 last the organization has had a remarkable increase in membership, going from 75 to 250 and increasing the revenue of the Exchange by additional dues and the renting of vacant desk space to the wonderfully high mark of 175 per cent. It is the intention to still further increase the membership until the mark of 300 is reached. When this is accomplished the books will be closed and will not be opened until the number drops below that figure.

The organization as a whole is very well pleased with the progress that has been made, and at the annual banquest, at which more than 350 guests were present, it was predicted that the coming year would undoubtedly be the best in the history of the Pittsburgh Builders' Exchange.

The Chicago Builders' Exchange

The annual report for 1913 just issued by the Chicago Builders' and Traders' Exchange indicates the passing of a year of financial and general benefit to the association. The twelve-page booklet gives the names of the 1913 officers and directors and also a list of the standing committees. In a short report, President John D. Corlett calls attention to the enrollment of 52 new members during the year and also pays tribute to the work of the sick and book committees. His financial report shows the association to have assets of $16,082,31. The secretary's report contains a detailed list of the year's receipts and expenditures, and also makes mention of the addition of three members to the honorary membership list: William Gavin, Ingwald Moe and Frank S. Wright. The treasurer's report and that of the membership and book committees show that good work has been done in each of their respective divisions throughout the year. Four members died during the year, and the association has now a grand total of 382 members on the books.

The Dayton Builders' Exchange

The members of the Builders' and Traders' Exchange of Dayton, Ohio, held their annual banquet at the Phillips House on December 18, the principal speaker of the evening being S. S. King. He strongly urged the establishing of trade schools in the cities, making the point that one of the reasons for the scarcity of skilled labor in the building trades was due to the lack of schools of this character.

Annual Election of Birmingham Exchange

The annual election of the Builders' Exchange of Birmingham, Ala., occurred on January 12, when the following officials were chosen:

President, W. T. Estes, who is president also of the Estes Lumber Company.
First Vice-Pres., Chas. M. Allen, a general building contractor.
Second Vice-Pres., W. A. Currie, who is manager of the sash and door department of the Moore-Handley Hardware Company.
Treasurer, J. H. Eddy, who is a sales manager of the Kaul Lumber Company.
Secretary, G. T. Stafford, whose business is also that of a wholesale building material broker.

There were three directors elected representing dealers and manufacturers; also two selected from among the general contractors and two from sub-contractors.

The revised Constitution and By-laws were unanimously adopted, the various reports presented showed the progress the organization has made in the past year, while the treasurer's report showed a surplus.

St. Paul Builders' Exchange

A Christmas party for the members of the Builders' Exchange of St. Paul, Minn., was the occasion for a most delightful gathering on the evening of Monday, December 22. The Christmas spirit was delightfully carried out by a gorgeous Christmas tree in the meeting room of the exchange, appropriately trimmed and lighted with miniature electric lamps. Charles Villaume played the part of Kris Kringle and fulfilled his duties in a most acceptable manner. Not only this but during the "Smoker" which was a feature of the evening he passed the cigars and made himself generally agreeable. He announced that he had good news for many of the members in the form of awards of contracts for various buildings to be erected in St. Paul during 1914. He then produced from his pack a bundle of "Uniform Contract" blanks appropriately inscribed and then he read off the names and handed the contracts to the various members concerned.

There were a number of other interesting features of the evening, including the following: P. M. Hennessy received the nomination for mayor of St. Paul under the new commission form of government; J. W. L. Corning was given a guarantee that no prison-made brick would be used in the erection of state buildings during 1914; Ed. Finck was presented with a document giving him a clear title to the position of second vice-president; John A. Seeger was presented with a "check" for $2,500,000 in settlement for all refrigerator patent suits, and then Kris Kringle presented each one present with a stocking filled with good things and a toy, all fixed up in the regulation style.

President Romer introduced J. W. L. Corning as the principal speaker of the evening. His remarks for the most part were directed toward Secretary A. V. Williams, who was accused of all sorts of things, and the speaker wound up by presenting him on behalf of the members of the Builders' Exchange of St. Paul with a gold watch and chain.

Meeting of Miles City Builders' Exchange

The members of the Builders' and Traders' Exchange of Miles City, Mont., held their annual meeting on Tuesday evening, December 23, when officers for the ensuing year were chosen as follows:

President	J. B. Morris
Vice-President	James Reagan
Treasurer	James Elzea
Secretary	R. H. Deebach
Sergeant-at-Arms	W. H. Reed

There were also appointed a committee on Entertainment and also a committee on Complaints.

Earnest efforts are being made by leading contractors and material men of Hartford, Conn., to form a Builders' Exchange, which will in a measure be an adjunct of the Board of Trade.

The Builders' Exchange of Oswego, N. Y., held its annual banquet on the evening of January 6 when an especially fine menu was considered in all its phases.

◆

Some Tools for the Building Mechanic

(*Continued from page 77*)

sition and is a feature which carpenters and builders cannot fail to appreciate.

In order that his tools may be kept in proper condition for use it is essential that the carpenter have in his kit means for sharpening them so that they may be always keen of edge. One of the means for accomplishing this end is through the use of carborundum stones which, as placed on the market by the Carborundum Company, Niagara Falls, N. Y., possess uniformity of grit in hardness and cutting qualities. As the name indicates, the stones are made of carborundum which is said to be as hard and sharp as the diamond. The line of stones is such as to meet all the requirements of the carpenter and the builder, those being specially designed for his use bearing the name of Combination Bench Stones, which are made with one face of coarse and one face of very fine grit. The coarse side can be used for sharpening dull tools, while the fine side is for putting on the finished edge. The stones are made in rectangular and round form, the latter being intended more particularly to permit of the circular motion used in sharpening chisels and similar tools.

In the line of abrasives the Pike Mfg. Company, Pike, N. H., has an extensive assortment which has been popular with carpenters and builders for many years. These consist of both natural and artificial stones and their advantages are set forth at great length in a copyrighted pamphlet sent out by the company in question and bearing the title "How To Sharpen and What to Use." The information is altogether too lengthy to give at this time but the carpenter can secure a copy of the pamphlet and thus learn of the way to not only sharpen his edge tools but also how to take care of his oilstones and some of the points to be observed in selecting a stone.

View showing 240 24-inch Copper, Burt Metal Top Ventilators (14th order) as applied to skylights on the Angus Shops of the Canadian Pacific Railway Co., Montreal. This building is 1,164 feet long and 160 feet wide. Note rotary ventilators on roof which were being replaced by Burt's. Have just ordered 6 more 24-inch Ventilators.

The Canadian Pacific Railway

Recognizing the unique merits of

Burt Combination Skylight and Ventilators

have replaced their old ventilators for BURT'S. When a world-famous railroad such as the C. P. R. adopts the "Burt," it speaks most eloquently for its efficiency and durability.

Where the glass top feature is used, by the means of our patented sliding sleeve damper it means no shutting off of light, whether the ventilator is open or shut. The sliding sleeve damper makes it simple to adjust the ventilation to any degree PERMANENTLY, without tying the rope to anything, as rope is forced into a special attachment.

The unobstructed air shaft insures a strong continuous "pull."

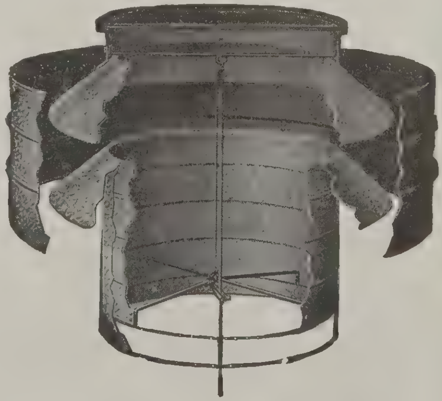
It is features such as these that have given the Burt the position of the PREMIER ventilator.

128-page catalog showing fine illustrations of mills, factories, shops, foundries and residences where Burt Ventilators are in successful use will be sent if you write for it.

The Burt Manufacturing Co.

312 Main Street, Akron, Ohio

GEO. W. REED & CO., Montreal, Sole Manufacturers of "Burt" Ventilators in Canada



Notice Patented Sliding Sleeve Damper never shuts out the light. Burt Ventilators also furnished with metal tops if desired.

BACK of UNIVERSAL'S production of 12,000,000 barrels of Portland cement per year are basic reasons. Chief among them is the unshaken confidence of cement users—great and small in

Universal
PORTLAND CEMENT

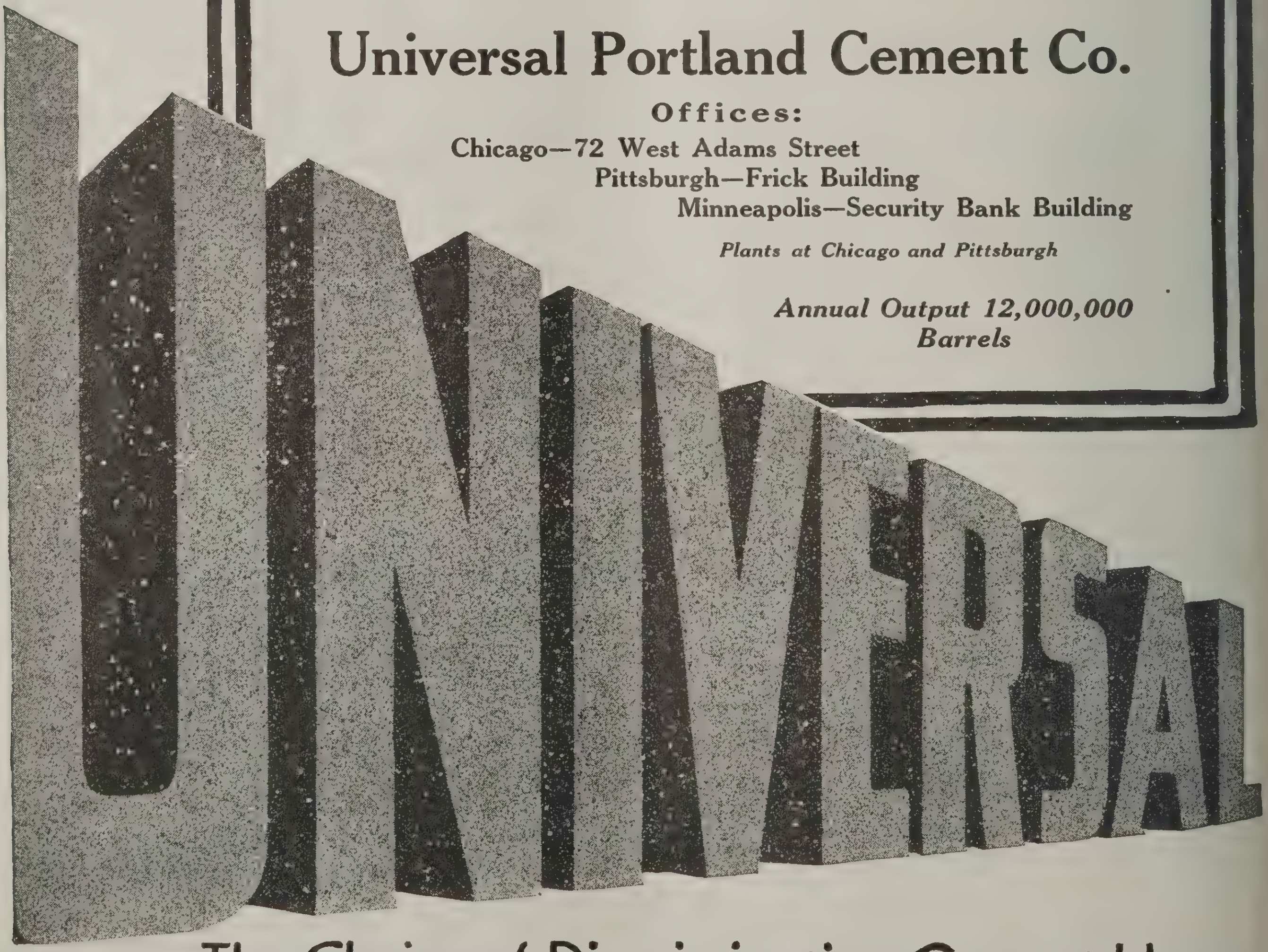
its proven quality, absolute uniformity and unvarying results.

Universal Portland Cement Co.

Offices:
Chicago—72 West Adams Street
Pittsburgh—Frick Building
Minneapolis—Security Bank Building

Plants at Chicago and Pittsburgh

Annual Output 12,000,000 Barrels



The Choice of Discriminating Cement Users

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Corbin Concealed Transom Lifter

A concealed transom lifter involving a number of interesting features and particularly suited for use in office buildings and other structures where the best material is employed is being placed on the market by P. & F. Corbin, New Britain, Conn. Its construction and operation are clearly indicated in the accompanying engravings. In use the T handle and plate which is attached to the sash are the only parts which are visible. By an ingenious arrangement of levers the power is multiplied so that the lifter is operated with comparatively little effort and it may be firmly locked in any position from "closed" to "wide open," the transom moving only when the handle is turned. A very good idea of the arrangement of these parts is indicated in Fig. 1 of the illustrations, while Fig. 2 clearly represents the gear mechanism, the front of the gear case being broken away, showing the toothed segment attached to the worm spindle gear, which permits an adjustment that will place the handle in the center of the casing. The rack moves up and down as the handle is turned, thus actuating the transom. The parts are few, simple and strong, and the point is made that any style, size or weight of transom may be handled with ease. The apparatus can be installed without change in ordinary construction of door frame in partitions as thin as 2 in. A well-arranged catalogue which the company has issued very clearly illustrates and describes this transom lifter, also a large number of other Corbin specialties. It is handsomely illustrated with half tone engravings and is not only an excellent example of the printers' art, but is highly creditable to the company sending it out. We understand that a copy can be obtained by any architect or builder who may make application for it.

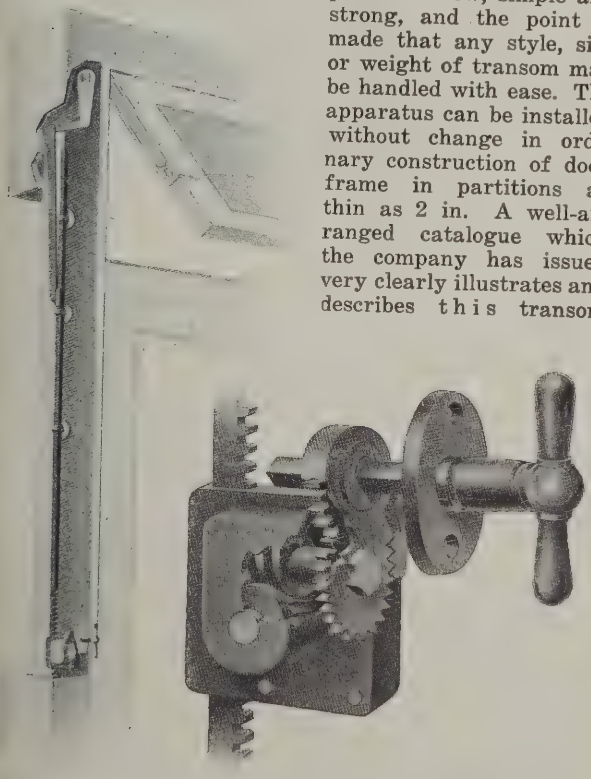


Fig. 1 — Showing the Operation of the Lifter

Fig. 2—The Gear Mechanism

Corbin Concealed Transom Lifter

Clincher Hooks for Conductor Pipe

A conductor hook of the design shown in Fig. 3 has recently been placed on the market by the Milwaukee Corrugating Company, Milwaukee, Wis., to which the trade name "Clincher" has been given. These hooks, in place of being galvanized, are tinned and are said to be made from Bessemer steel, as the company holds that this is superior to malleable iron or any other material for that purpose. The hooks are sharpened on the end so they may be driven into mortar without bending or deflecting the hook in any way and are so constructed that they will not split the wood when driven into it. The hooks are so shaped, the company explains, that when being driven into the wall, they will pull towards instead of away from the pipe and the studs help to get on the pipe a clincher hold, from which it derives its name.

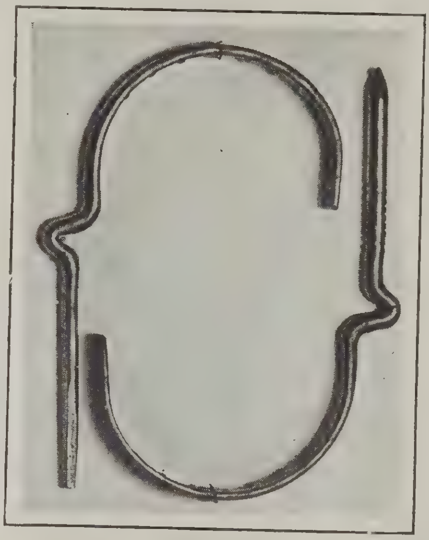


Fig. 3—Clincher Hooks for Conductor Pipe

"Creo-Dipt" Stained Shingles

Many beautiful residences, large and small, are illustrated in an attractive booklet just issued by the Standard Stained Shingle Co., 1030 Oliver street, North Tonawanda, N. Y., and which shows the many forms of design in which "Creo-Dipt" shingles, manufactured by the company, find a harmonious application. The many views presented well illustrate the fact that the ordinary method of laying shingles is susceptible of various modifications which render the product a distinct asset to the architect in his effort to combine the artistic with the practical. A little bungalow designed by Arthur N. Oviatt, of Cleveland, Ohio, is shown, in which a unique and pleasing effect is produced by laying the courses alternately 2 and 6 inches to the weather. This breaks the surface of the exterior walls into horizontal divisions which harmonize well with the stone work of the porch pillars and chimneys.

A more elaborate dwelling in Jamestown, N. Y., by Freeburg and Fidler, architects, obtains the thatched effect in the roof by the uneven trimming of the shingle ends. The rounding of otherwise sharp edges in the roof lines, tends to highten this effect, as well as to soften the entire design of the structure.

For this and other desired effects the company furnishes the Dimension Width shingles in all sizes in fancy sawed butts. Although its regular stock of "Creo-Dipt" shingles are furnished in 25 distinct shades, the company holds itself in readiness to furnish any special tint desired and will submit samples without charge to the prospective purchaser.

"Creo-Dipt" shingles, as the name implies, are treated with creosote to preserve them, and the company calls attention to the fact that the system of staining the shingle before it leaves the factory is superior to the awkward method of treatment at the building site.

The booklet is valuable as a suggestion to architects and builders, of many unique designs in dwellings, and will be sent to any one who mentions *The Building Age* in his letter of application.

Business of the Gordon-Van Tine Company

As an indication of the activity in one of the many branches of the building line during the year just closed it is announced by the Gordon-Van Tine Company, Davenport, Iowa, that its business with carpenters and contractors showed a most gratifying increase. Many new customers were added and old customers are said to have steadily increased the volume of orders placed with the concern—a condition of affairs which demonstrates in a most striking manner the fact that the company has won the confidence of carpenters and building contractors and is giving them prompt and efficient service. In the mammoth plant of the company at Davenport shown in Fig. 4 and built of brick and concrete, also in its extensive lumber yards at St. Louis, there is carried in stock ready for immediate shipment everything in the building material line from the staple items of sash, doors and lumber to the finest millwork which ordinarily requires the mill several weeks to turn out. Every department of building material is represented so completely that the requirements of any contractor or builder can be supplied direct by the company. The plant is equipped with every facility for the rapid handling of orders, having direct connection with various railroads. Its double loading platforms are such as to accommodate 22 cars at one time. A notable feature of the business policy of this concern is its guarantee of quality, safe delivery and satisfaction of money refunded and freight paid both ways. The claim is made that whether the order be for a single item or for a complete house bill, it receives the same careful expeditious handling. The new catalogue which the company has issued contains offers of 5000 bargains in building material, each of which is said to represent a considerable saving when compared with retail dealers' prices. The Book of Plans issued by the Architectural Department of the company is referred to as a great factor in the success of the enterprise. In connection with its announcement the Gordon-Van Tine Company make a special concession to carpenters and builders which is well worth their investigation.

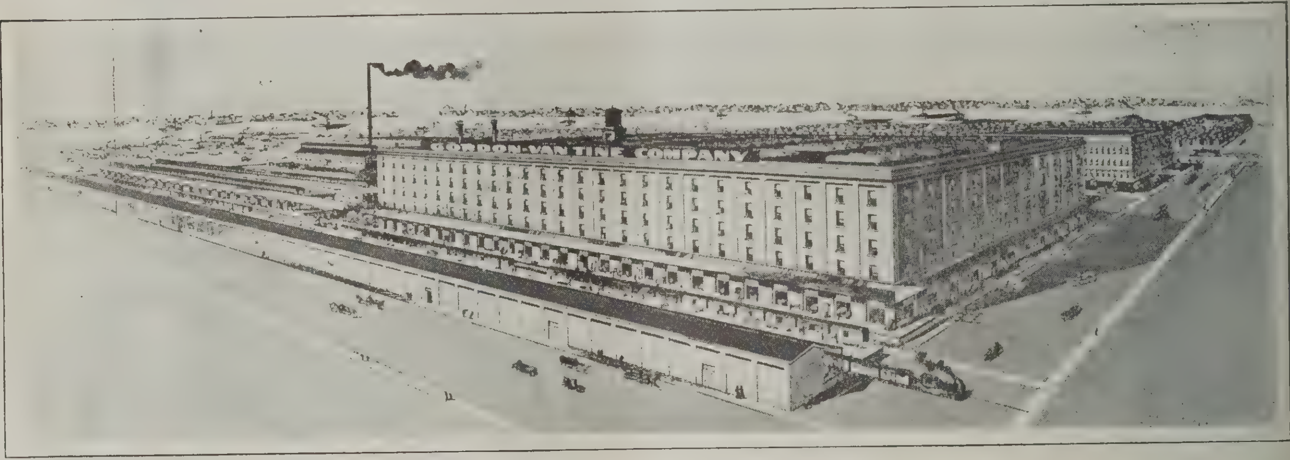


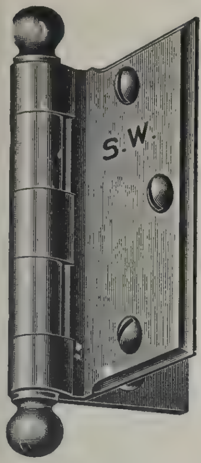
Fig. 4—Birds Eye View of the Mammoth Plant of the Gordon-Van Tine Co. at Davenport, Iowa

The Clover Leaf Builders' Hoist

The advantages of a gasoline engine for supplying power to a builders' hoist are emphasized in a recent pamphlet, issued by the Clover Leaf Machinery Co., South Bend, Ind., in which its Clover Leaf builders' hoist is described. This hoist has a drum, sheave and winchhead, all reversible, and so mounted as to make possible the independent operation of each. The sheave and drum, one or both, may be disengaged from the main shaft by means of an eccentric. The clutches are of the contracting band type and provision is made for quick adjustment to offset wear. Compactness of design and lightness of weight, sufficient to permit easy transportation are claimed for this hoist, and the fact that it is operated by gasoline engine makes the services of a licensed engineer unnecessary and eliminates the necessity for maintenance of a boiler fire. The hoisting drum is provided with a safety ratchet and pawl which is used as a precaution while lifting exceptionally heavy loads and may also be used when it is desired to hold the load at a certain height while the winchhead is being used as a boom swinger. The base and uprights are cast in one piece, thus insuring rigidity. All gears and other working parts are effectively covered by a substantial sheet metal shield which affords the protection required by the safety regulations of several municipalities.

The Clover Leaf concrete mixer is described in another pamphlet just issued by this company. This is a concrete mixer of a unique design which is said to eliminate the necessity for blades or other mixing devices. The cross section of this mixing drum resembles the outline of a clover leaf in which the curves of the leaves have been modified into involute forms. As the material is carried around in the revolving drum, it falls of its own weight when it reaches a certain point, and, in so doing, is said to be doubled over three times during each revolution. The designers claim that this method of mixing imparts a positive mixing and kneading action to the entire mass, and that, owing to the action to which the material is subjected by the involute curves, the tendency of the aggregates to gravitate to and accumulate on the bottom on account of their respective weight is overcome. The claim is made that the mass is picked up, turned over and doubled as effectively as though the operation were accomplished with a shovel and as a result the stones, sand, cement and water are present in equal proportions throughout the entire mass. The machine is designed to accomplish from 80 to 90 complete distributions per minute with no tendency to separate the coarse and fine material. Attention is called to the fact that no outward angles are present on the machine to serve as pockets in which the material can lodge and accumulate. All projecting points are located on the inner surface of the mixer and thus are perfectly scoured by the sweeping action of the mass.

(Continued on page 86)



Time and Labor Saved and the Owner Satisfied

STANLEY'S
No. 165
Ornamental
Surface
Butt

BEVELED EDGE
UNEQUALED IN QUALITY

With these Butts it is not necessary to mortise the door, as the ornamental leaf screws on the surface.

The Butts can be changed to either right or left hand by simply unscrewing the slotted tip and reversing the pin. Sizes 1½ to 4½ inches.

The Guaranty TRADE S.W. MARK of Quality

Write us for a Handsome Booklet of Wrought Steel Hardware

Department E

THE STANLEY WORKS
NEW YORK NEW BRITAIN, CONN. CHICAGO

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895

TRADE MARK.

TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

GENASCO
THE STANDARD OF EXCELLENCE
TRADE MARK
REG. U.S. PAT. OFF.

Pay less by the year for roofing

Figure the cost all the way through, if you want real economy.

Ordinary roofings, though cheap in the beginning, are often costly in the end because they don't last.

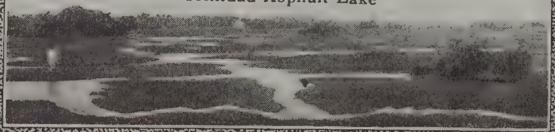
Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

is most economical. Its wonderful endurance comes from through-and-through waterproofing with natural asphalt.

While with ordinary roofing repair-expense goes on and on, Trinidad Lake asphalt makes first cost of Genasco the last cost also.

Insist on Genasco from your dealer. Look for the hemisphere trademark. Mineral or smooth surface. Several weights. The KANT-LEAK KLEET is packed in smooth-surface roofing rolls. Write us for samples and the Good Roof Guide Book. Free.

The Barber Asphalt Paving Company
Largest producers in the world of asphalt and ready roofing
Philadelphia
New York San Francisco Chicago



Trinidad Asphalt Lake

Living Room and Residence of W. H. Johnson, Garden City, L. I. Finished inside and outside with Bridgeport Standard Wood Finishing Products. Alfred Busselle, Architect; Van Name & Co., Contractors.

YOU can have the most beautiful woodwork in your home by using

BRIDGEPORT STANDARD
WOOD FINISHING PRODUCTS

It is the opinion of leading architects, decorators, painters and contractors that *Bridgeport Standard Wood Finishing Products* bring out the natural markings of the grain and figure of all kinds of wood better than any other materials; also that they are *more durable* and *more practical;* further, that they are *more economical* —measured by the *much better* results and the many years of additional service they give.

Ask for our "Modern Wood Finishing" — a beautifully illustrated book, showing all of the popular finishes in their actual colors and giving a complete treatise on the art of modern wood finishing. Simply write your name and address on the margin of this ad. and mail it to us.

SOLE MANUFACTURERS
THE BRIDGEPORT WOOD FINISHING CO.
Box 104 NEW MILFORD, CONN., U.S.A.
New York Chicago Boston

Expansion Bolt of Unique Design

An expansion bolt for which much is claimed is that shown in the illustrations and manufactured by the Paine Co., 1316 Corn Exchange building, Chicago, Ill. As will be seen from a glance at Fig. 5, which shows a cross-section with the bolt in actual use and clearly indicating the anchor-like hold, the bolt consists of four parts—the bolt proper, the washer, which fits against the head and between the latter and the surface of the wood or other material, and two casings, one of which is threaded on the inside and engages the thread of the bolt. As the bolt is turned, the slight friction resulting from a snug fit between the outer casing and the surface of the wood or other material into which the bolt is inserted, produces sufficient resistance to start the gripping action, after which any additional turns upon the bolt will increase this grip upon the surface of the wood. Fig. 6 shows a double cone grip for special cases in which the single grip will not produce a sufficient holding action. It is claimed that these bolts are entirely satisfactory for the attachment of fixtures to glass, marble and slate as well as for other purposes. The manufacturers offer to send a sample bolt to any one mentioning *The Building Age* in his letter of application.

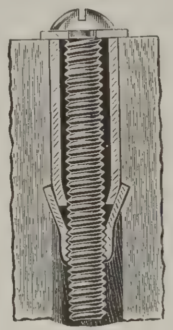


Fig. 5.—Cross Section Showing Use of Bolt

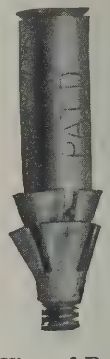


Fig. 6—View of Bolt with Double Cone Grip

EXPANSION BOLT OF UNIQUE DESIGN

The Drilhammer

The Orr & Lockett Hardware Co., Chicago, Ill., has opened a New York office with R. Morley in charge for the purpose of handling its "Drilhammer" and other business. The "Drilhammer" is a tool of which two vital factors are simplicity and ruggedness. A large cut-tooth steel spur gear meshes with a smaller pinion on the machine's shaft. Upon the shaft is mounted a drop forged spider having pivoted at each end a hardened tool steel hammer element. These hammer elements are free to swing upon the spider with the result that when the tool is revolved they fly out and are held out by centrifugal force, flying around in their paths at high speed. At a definite point each hammer element strikes squarely upon the end of the drill, giving up the complete measure of its energy and turning on its pivot, passing clear beyond the drill blank. As soon as it has passed, the centrifugal force agin exerts itself and the hammer immediately swings back into place ready for the next bolt. The claim is made that with every revolution of the handle approximately 13 blows are struck by the hammers, thus clearly emphasizing the time and labor saving advantages obtained in the Drilhammer over the ordinary hammer and drill. In fact, one tool is said to do the work of two, and do it better, quicker and at less actual labor cost.

New Woodworking Machine Catalogue

A large amount of valuable information relative to woodworking machines as manufactured under the trade name of "Famous" by the Sidney Tool Co., Sidney, Ohio, is embodied in the new 1914 catalogue of 128 pages, just issued by this concern. A number of well-executed half tone illustrations amplify the text, which begins with a detailed discussion of the various band saws with their different resawing attachments, safety guards and saw filing and fitting clamps. After these come the Famous No. 2 variety saw, the No. 3 combina-

(*Continued on page* 88)

FREE!!

Overland Automobile

50 Splendid Prizes!

Contest
Starts Feb. 15th
Open to Contractors
and Carpenters Only

We are going to distribute among Carpenters and Contractors 50 splendid prizes, including a brand new 1915 model 5-Passenger OVERLAND AUTOMOBILE. Prizes total $1,225. No dealers or individuals who are *not* engaged in the building industry will be allowed to enter the contest. Write at once for Free Contest Circular.

Win the Overland
or a Splendid Chest of Tools

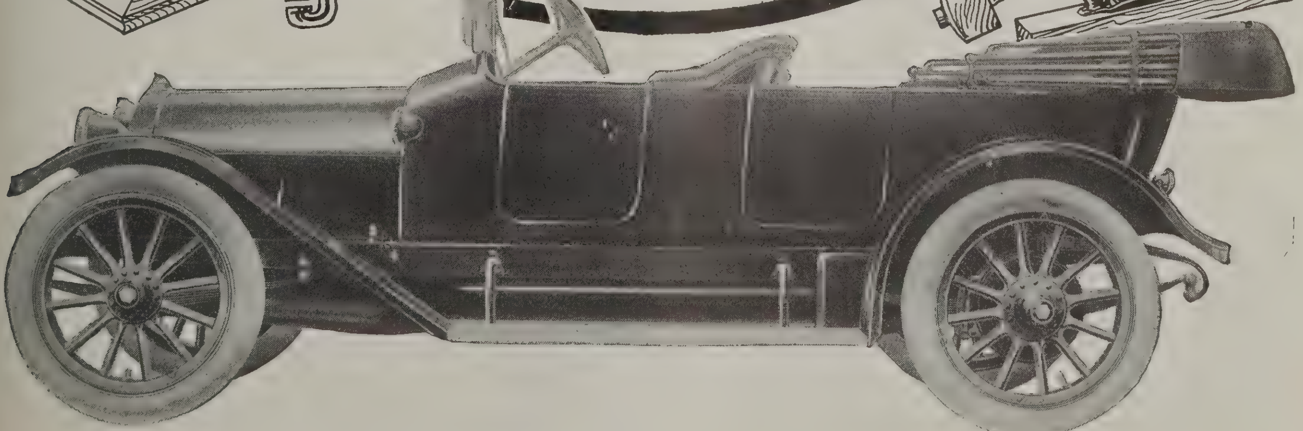
This contest is for the purpose of keeping old and new customers awake to the big inducements on Building Material offered in our Grand Free Building Material Catalog. The prizes are practical, valuable, and well worth hustling for. In addition to the Automobile, there are hundreds of dollars' worth of the finest tools—*everything you want.* Start early—no time to lose!

Contest Circular Free

The big free Contest Circular gives complete specifications of the Overland Automobile and describes and illustrates the immense assortment of tools to be distributed. Gives Rules of the Contest and full information.

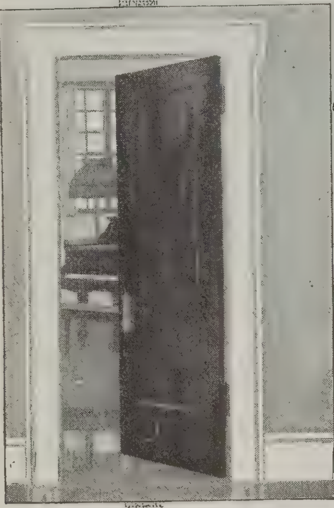
Ask for latest edition of our Grand Free Catalog of Building Material. Write for Big Free Circular today and *go after that great big beautiful Overland!*

GORDON-VAN TINE COMPANY
683 Case Street
Davenport, Iowa
(278)



Here's a mahogany finish that won't fade

You've long wished for a fadeless mahogany finish. You can get it if you specify a coat of Lowe Brothers Non-Fading, Dark Mahogany Oil Stain; then one of



Lowe Brothers

Mahogany Glaze

—and a finishing coat of Lowe Brothers Inside Rubbing finish. The result is a full, rich color and a beauty resembling solid mahogany—and it *won't fade.* Contractors specifying Lowe Brothers products, insure good results for their customers and a good reputation for themselves.

Free: Specification Book

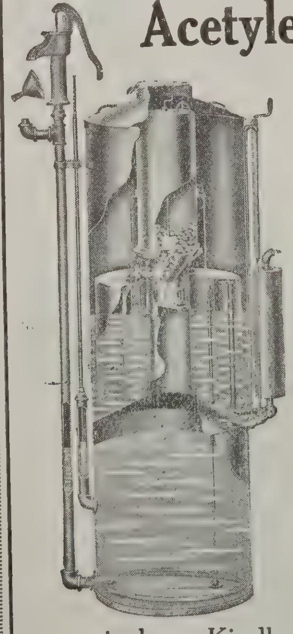
Gives you the essential facts for preparing clear and definite specifications on varnish and paint—tells how to select the proper materials and use them to best advantage. Write for this book today.

The Lowe Brothers Company
518 E. Third St., Dayton, Ohio
Boston, Jersey City, Chicago, Kansas City, Minneapolis
Lowe Brothers, Ltd., Toronto, Canada

We Want Architects and Building Contractors

to acquaint themselves with our system of

Acetylene Lighting



We are manufacturers of the Jackson "Basement" and Michigan "Pit" Generators, the latter designed to be placed anywhere in the ground.

The most beautiful, simple and economical system of lighting in existence.

WANTED

We have some very productive territory open for some good, hustling representatives. Write for full particulars. Kindly state experience if any.

Night Commander Lighting Co.
Jackson, Michigan

tion saw, the Famous saw table, the Universal saw, the motor-drive swing saw, and finally the hand jointer and the various planers, shapers and borers manufactured by this company. The latter part of the book is devoted to a number of useful tables and paragraphs of information relating to woodworking machinery and appliances, which make the catalogue a useful general reference work on this subject.

The No-Key Padlock

A padlock which requires no key to open it, and which is operated by pressing the figures upon the proper combination of buttons, has just been placed on the market by the Edwards Mfg. Company, 423-443 Eggleston avenue, Cincinnati, Ohio. There are eight buttons on each side of the padlock, a general view of which is shown in Fig. 7, these being numbered from 1 to 8. As there are more than 40,000 combinations possible the company points out that each purchaser is sure of a combination known only to himself. The no-key padlock is made of solid brass and bronze in one size only, and weighs 5¼ oz. It is designed to do away with keys and to save time, money and pockets. It is referred to as being indispensable to the owner of an automobile, boat or bicycle, and is an excellent device for locking the stable, the machine and tool house or any of the outbuildings. The statement is made that it has required eight years of earnest labor and experimentation to perfect this push button padlock and the result is a device which cannot fail to be appreciated by everyone, regardless of his vocation, who may have occasion to make use of a padlock.

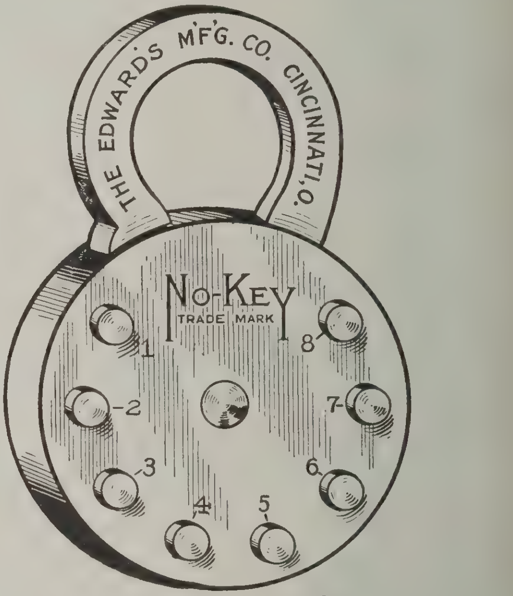

THE EDWARDS MFG. CO. CINCINNATI, O.
NO-KEY
TRADE MARK
1
2
3
4
5
6
7
8

Fig. 7—The Edwards No-Key Padlock

A New Year's Greeting

P. & F. Corbin, New Britain, Conn., sent out the last week in December to their many friends in the trade a New Year's greeting, reading as follows:

> "May time pass pleasantly with you in the year to come and bring you an abundant fulfillment of all your hopes and desires."

The greeting was in the shape of a four-page note-size folder carrying upon the third page the name of the manager at New Britain, as well as the names of the managers of the warehouses in New York City, Chicago and Philadelphia.

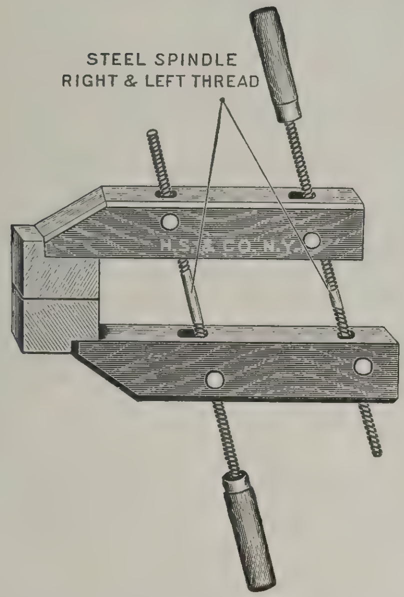
New Plant of Eller Mfg. Company

During the last week of the year just closed the Eller Mfg. Company, makers of sheet metal specialties, Canton, Ohio, took possession of its new plant which has been in course of construction for a little more than twelve months. The building is fireproof throughout, being of brick and steel construction with metal window sash. Use was also made of the company's

(*Continued on page* 90)

HERE IT IS!

AN ADJUSTABLE (Jorgensen Patent) HAND SCREW



LOOK AT THE PICTURE!

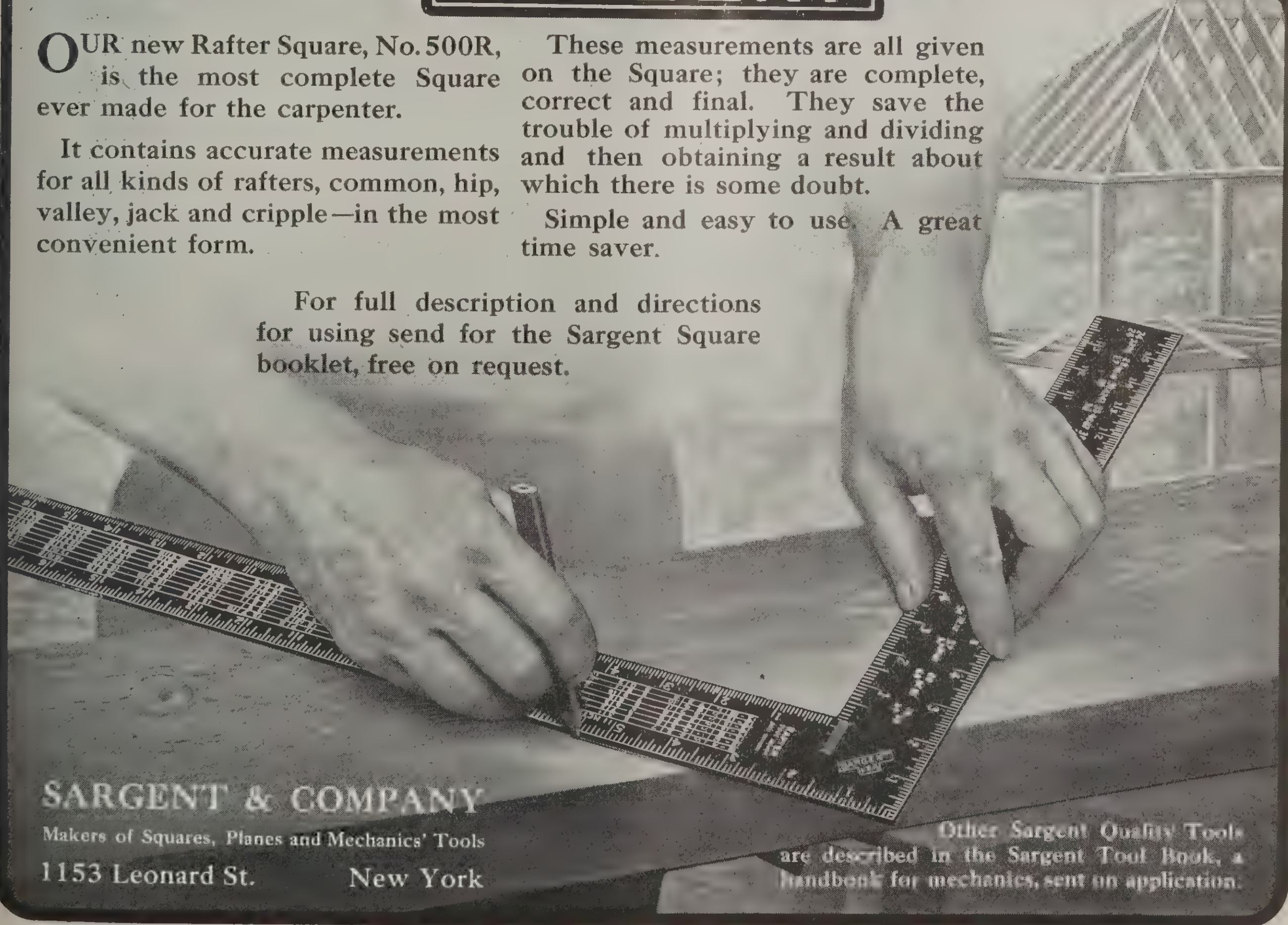
The steel spindles work in steel sockets that permit of swivel movement while the jaws are ***absolutely*** rigid when tightened.

There are almost hundreds of positions possible, making the Jorgensen Screw superior to the old style by this immense advantage.

Send for Special Circular No. 3154 and be convinced

HAMMACHER, SCHLEMMER & CO.
HARDWARE, TOOLS AND SUPPLIES
New York, Since 1848
4th Ave. and 13th St.

SARGENT



OUR new Rafter Square, No. 500R, is the most complete Square ever made for the carpenter.

It contains accurate measurements for all kinds of rafters, common, hip, valley, jack and cripple—in the most convenient form.

These measurements are all given on the Square; they are complete, correct and final. They save the trouble of multiplying and dividing and then obtaining a result about which there is some doubt.

Simple and easy to use. A great time saver.

For full description and directions for using send for the Sargent Square booklet, free on request.

SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application.

DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.

TAINTOR'S POSITIVE No. 7
TAINTOR MFG. CO. NEW YORK U.S.
Self-adjusting, except turning anvil to change setting

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.

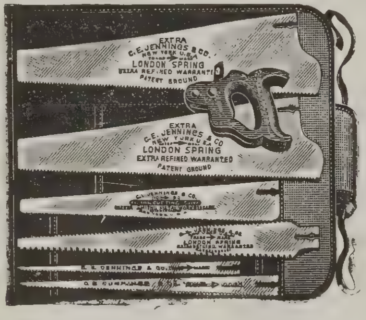
Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., **New York**

C. E. Jennings Arrow Head Combination Sets of **SAWS**

Adjustable Handle



No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set in a Box or Leather Case if So ordered Extra. We will send a set by parcel post if your dealer cannot supply you.

Send for circular.

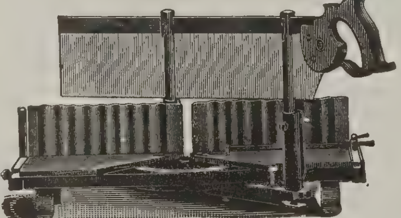
Sole Manf's

C. E. JENNINGS & CO., 71-73 Murray St., New York

Goodell Mitre Box

Made of STEEL—Cannot Break

First in Quality and Improvements



Automatic Stops for holding up saw.

Corrugated Backs Graduated.

Gauge for Duplicate cuts and many other features.

If you want the best you will take no other.

Send for Circular K.

GOODELL MFG. CO., Greenfield, Mass.

No. 0 PERFECTION

Our vest pocket edition for Carpenters, Plumbers and households; fitted with 4-inch Corundum Wheel. Weight 5 lbs.

Mr. Carpenter, just think for $2.50 you can carry in your pocket a complete sharpening outfit. No dirt—no grease. If your dealer does not carry them, we will send prepaid on receipt of price. We also make six other sizes.

STAR SPECIALTY MFG. CO.,
227-233 W. Erie St., Chicago

well-known "Never-leak" skylights, of which there were 146, and 50 "Konical" ventilators. The factory building covers two acres of ground, and is located almost in the heart of the city on a seven-acre tract, thus giving ample room for expansion as the business of the company may demand. The office is located in one corner of the building, and this is strictly fireproofed from the factory by brick walls 13 in. thick on all four sides. The office is 56 ft. square and is two stories and basement in hight. The basement is used for general storage and the ground floor for general office work, while the second floor is utilized for drafting and general meeting rooms. The machinery is practically all new, and all is driven by electric power.

The new plant is located directly on the line of the Pennsylvania Railroad, but the company has switch connections with the Baltimore & Ohio and the Wheeling & Lake Erie Railroads. The position is such that all cars for loading run inside the factory, where there is room for loading six cars at a time. The manufacturing departments are so situated that stock makes a full circuit during the process of manufacture and when finished is located in space set aside for manufactured products, convenient and handy to loading platforms alongside the railroad track, thus doing away with any doubling back or re-handling.

The company was originally started some 30 years ago by J. H. Eller, and was operated as J. H. Eller & Co. Some eight years ago, however, Mr. Eller disposed of his interests and a new concern was organized known as the Eller Mfg. Company, with the following officers: *President and Treasurer,* J. F. O'Dea; *Vice-President,* I. M. O'Dea; *Secretary,* H. V. Pay. These officials, with G. W. Hilibish and Charles C. Bolus, constitute the board of directors. All are actively connected with the business, and give it their entire attention. The company carries at all times an exceedingly large stock, thus enabling prompt shipments. In fact, the company boasts of shipping all orders the same day received, unless it happens to be an order which has to be specially manufactured.

The Rustless Rule

A rule which is intended for general use, and which is light, strong and durable, has just been placed upon the market by the Reliable Stamping Company, Inc., 369 Seventh street, Buffalo, N. Y., and is known under the name indicated by the title of this article. The appearance of the "Rustless" rule partially unfolded is shown in Fig. 8 of the engravings. It is made of luminoy, which is described as a special alloy of aluminum having a bright surface and requires no polishing or rubbing to keep it bright. The joints are made of high-grade spring steel and will not work loose. The figures are large and clear, and the statement is made that it is accurately and distinctly graduated to sixteenths of an inch on both sides. The figures and graduations are stamped in the metal and cannot, therefore, be rubbed out or worn off by abrasion. The rule weighs only a trifle more than one ounce per lineal foot. It is made in 2 to 6-ft. lengths, and is claimed to be many times more economical than the wooden rule. The New York City representative of the manufacturer is the MacCoy Sales Company, 157 Chambers street.

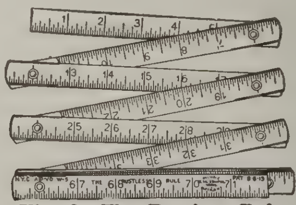
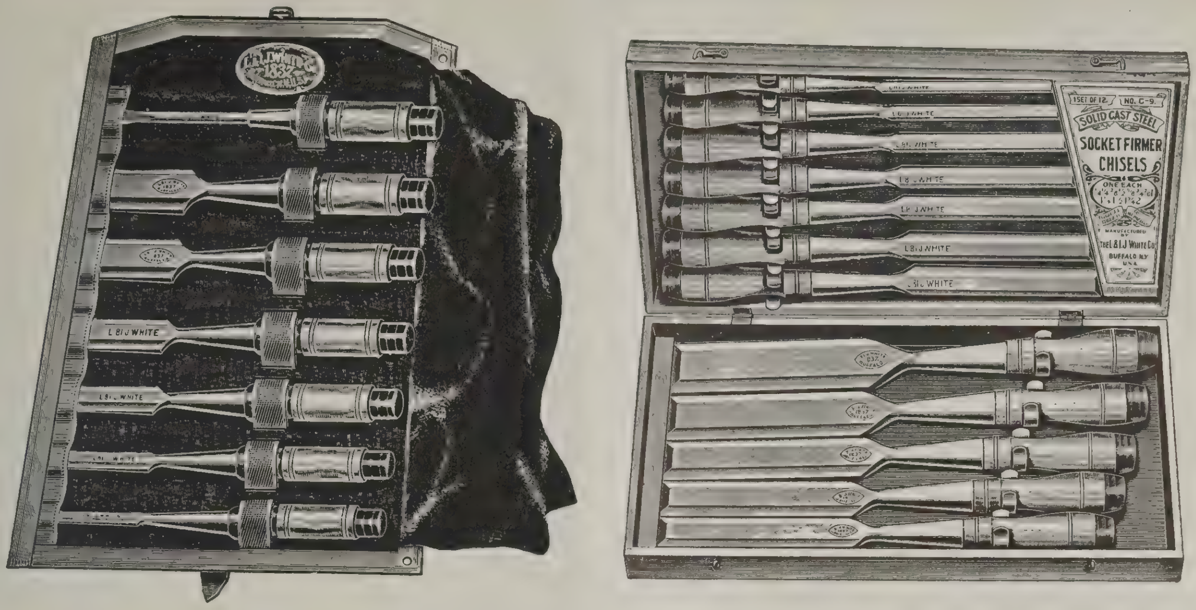


Fig. 8—The Rustless Rule

Catalogue of the Smith Concrete Mixer

Several changes in the Smith mixer line as compared with the last year's models are to be noted in the new catalogue No. 300, just issued as a New Year's greeting to the trade by the T. L. Smith Co., 1134 Thirty-second

(*Continued on page* 92)



The Kind Worth While

Every Man Wants to Get 100 Cents Value for $1.00

If he buys a cheap tool he is gambling that it is going to be worth what he paid for it—he is taking a chance. Once in 100 times he wins. White Tools are a little more expensive, but it's a sure thing he is going to win. They will wear enough longer to more than pay the difference—and think of the time saved in grinding.

Ask your dealer to show you our catalogue; if he hasn't it, ask him to send for one. If he insists on trying to sell you some other kind, tell him you are not a "just as good" man—drop us a card and we will sell you direct.

THE L. & I. J. WHITE CO., No. 100 Perry St., Buffalo, N. Y.

WHEN TOOLS GET TIRED

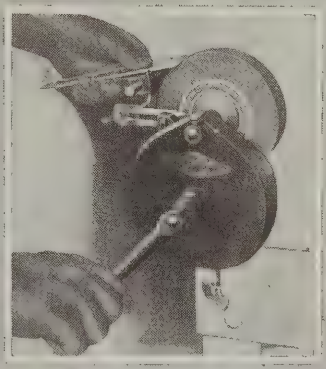
There are times when edge tools need refreshing.—Bring them back to a keen-cutting edge on a

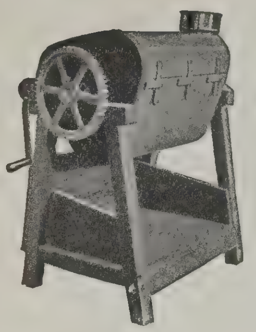
Carborundum Niagara Grinder

These little machines are fitted with Carborundum wheels and a practical tool rest.—It takes but a jiffy to grind the tool true and keen—then a couple of rubs on a Carborundum Sharpening Stone and the tool is ready for service. Carborundum Niagara Grinders are sturdy, durable, mechanically simple, machines—smooth running, high speeded—nicely finished—genuinely serviceable.

Made in several sizes, for tool-kit or work-bench.
Ask your hardware man.

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.





MIX

With a Mixer

With mixers selling at the prices we are offering then, no one doing concrete work can afford to be without one. Hand mixing is slow, expensive and wasteful. Laborers are hard to get. Machine mixing is faster, cheaper and much more thorough and uniform. Lansing hand mixers for shop use sell at from $24 (like cut) to $75 each—three sizes. Power mixers (like cut) sell from $300 up—five sizes. Can be equipped with side loaders, automatic water tanks and all up-to-date conveniences. Capacity a batch a minute.

This mixer is the ideal machine for the contractor. Light in weight, wide gauge, can be moved anywhere and will stand the wear and tear of rough streets and country roads.

Don't tie yourself down to the small unprofitable jobs by not having a mixer. You can do a big job and make a nice profit with a machine in the same time that you would do a small one and pay out all your profits for hand labor.

Owning a mixer gives a contractor prestige and standing in his community, and puts him in line for the better jobs.

Write for the mixer catalogs.

LANSING CO., 720 Cedar St.
LANSING, MICH.
The Home of the famous "Broncho" Mixer
AGENTS EVERYWHERE

The Roof that Lasts the Longest and Costs the Least

is the *only* roof that wins a satisfied customer and builds up your reputation. The wise contractor knows that

SHELDON SLATES

is the only material he can afford to consider. Because they can be used on buildings of every type at a cost but a trifle more than good shingles. Because—SHELDON'S SLATES remain unaffected by heat or cold, lightning or fire, long after the structure has gone to decay. Because they are solid stone through and through mined in thirty sizes and four colors—Red, Green, Purple, Black—to suit individual tastes and surroundings. Because—any structure that is strong enough for shingles will support SHELDON'S SLATES. Quick to obtain, easy to lay. Quarry price for one square no greater than for one hundred. You can make more money and land more contracts for SHELDON'S SLATES than by handling inferior substitutes. Get our booklet, The Reason Why. *Grasp* our proposition *today*. The others are glad they did.

F. C. SHELDON SLATE CO.
GRANVILLE, N. Y.

street, Milwaukee, Wis. One of the important variations to be noted is in the design of the water tank as illustrated in the catalogue. This tank as now designed is an enclosed container equipped with air valve and three-way inlet and outlet valve and a gauge glass for showing the amount of water. The mechanism of the power tilt employed in the Smith mixer has been changed in gearing to accomplish a more speedy delivery of material. The new design of the sideloader reduces the height of the frame work and makes material changes in the hoisting mechanism, consisting of the elimination of the long shaft parallel to the sill which was used to carry the hoisting drum. In the present model the continuous cable is cut in half, the first section of cable extending from a small drum carried on a short heavy shaft to a drum of larger diameter carried on the overhead shaft. This overhead shaft likewise carries two small drums which care for the single line of cable which actually hoists the skip. By handling the hoisting cable in this manner it is claimed that a great amount of friction is eliminated. The Smith side gate car substitutes for the old lever operated gate a rack and pinion gate operated by a cross shaft on which is mounted wheels for convenience in handling. This gate is designed to fasten tightly, lift readily, and accurately control the flow of concrete. Particular attention is called to the fact that in the new catalogue different models of Smith mixers are renumbered and a table is given to show the changes.

Something About Hardwood Flooring

It is seldom that as firm a stand is taken against the cheapening of product at the expense of quality as that contained in a recent booklet issued by the John Schroeder Lumber Co., Milwaukee, Wis., wherein is presented a very thorough discussion of the problems which enter into the manufacture of hard wood flooring and the reasons why the good product costs more than the inferior—a discussion which has a wide application in all lines of manufacture. Especial stress is laid upon the necessity for thorough seasoning and drying of the stock to avoid subsequent warping after laying. The subject of perfect matching is considered and its importance in the laying of the finished floor. A number of excellent colored half-tones, are presented, illustrating the various styles and designs of flooring carried and the various combinations for the production of harmonious results.

Northern Floor Surfacer

A floor surfacer designed especially for surfacing and polishing terrazzo and marble tile floors and operated by motor or gasoline engine, as may be most convenient, has been placed on the market by the Northern Floor Surfacer Company, Green Bay, Wis. It consists of four shaft-driven rubbing heads carried by a gear drum which is mounted at one end of a four-wheeled carriage. In one type the gear drum is also caused to revolve while in the smaller size the gear drum is stationary. These rubbing heads are caused to revolve in pairs in opposite directions, thus overcoming any tendency of the machine to creep. Each rubbing shaft is held down by springs with adjustable compression on ball bearing caps, and a raising and lowering device is provided by which the carriage may be readily raised and lowered, thus putting any desired pressure on the rubbing stones.

"The best is none too good" says the Sedgwick Machine Works, 123 Liberty Street, New York City, concerning the band brake dumb waiter which they are manufacturing. It is designed especially for use in deep wells where a strong and easy running dumb waiter for hand service is required. Attention is called to the fact that the "Sedgwick" hand power elevators and dumb waiters embody features which the architect, the builder and the house owner should not overlook. The 1914 catalogue which has just been issued contains many interesting particulars regarding the product of this concern.

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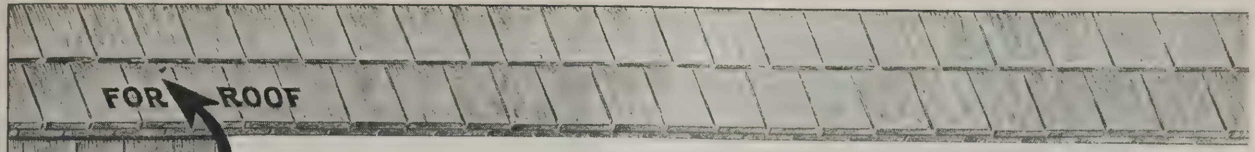
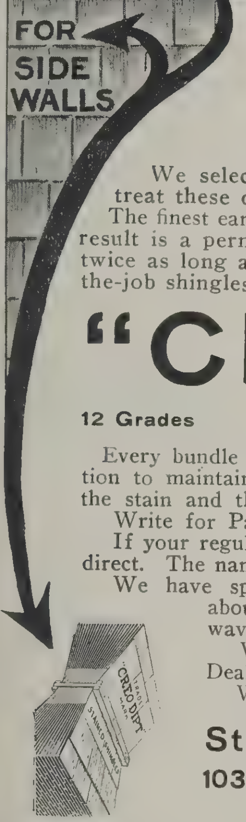




The Shingles That Come in Bundles Already Stained Ready to Lay and to Last Longer Than Paint

We select Washington Red Cedar Shingles, in random widths and cut different dimensions. We treat these dried shingles by our special process of creosoting and coloring.

The finest earth pigments are ground twice in pure Linseed Oil and the highest quality Creosote Oil. The result is a permanent shingle stain with a preservative effect that makes "CREO-DIPT" Shingles last twice as long as brush-coated or painted shingles or natural wood and look better than any stained-on-the-job shingles you ever saw.

"CREO-DIPT" STAINED SHINGLES

12 Grades **16-18-24-inch** **25 Different Color Shades**

Every bundle bears our trade-mark name "CREO-DIPT." That is your safeguard. We have a reputation to maintain. We are responsible for both the quality of the stain and the shingles—no wedge-shaped shingles.

Write for Pad of Colors on Wood.

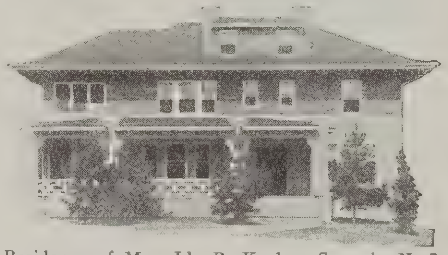
If your regular dealer cannot supply you, we will supply you direct. The name of your architect would be appreciated.

We have special information for architects and builders about "CREO-DIPT" Shingles bent and sawed with wavy butts to produce that Thatched Effect.

We have an attractive proposition for Lumber Dealers in unoccupied territory.

Write at once.

Standard Stained Shingle Co.
1030 Oliver St No. Tonawanda, N. Y.

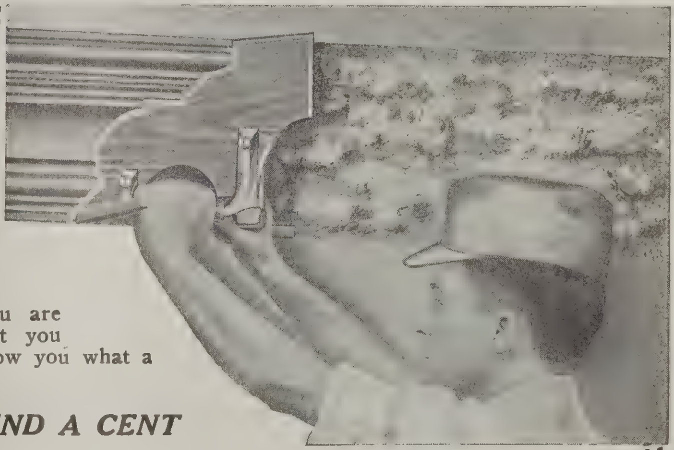


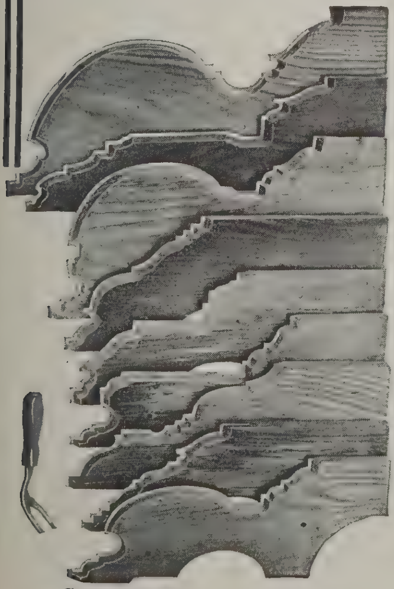
Residence of Mrs. Ida R. Kaplon, Summit, N. J. One color tone on roof, another on side walls. Architect, Nathan Myers, Newark.

Hurry Up! Get Yours!

I've got a Monarch Patent Cornice Mould all packed and ready to send to you by parcel post as soon as you send me your address.

I know you'd like to decorate your own parlor or dining room with a nice, fancy plaster cornice. Or, perhaps, you'd like to do an extra nice job in some house you are building now. Here's your chance. It won't cost you anything. I'm going to send you this tool just to show you what a good one it is.





Complete Set Consists of Blade Holder, 10 Blades and Blade Scraper

DON'T SPEND A CENT

I'll send you the Monarch Cornice Mould on **Ten Days' Free Trial.** You don't have to buy it, but I want you to try it. Use it all you want to. If you'd like to buy it, I'll sell it to you, but I want you to test it first and prove to your own satisfaction that you won't be throwing good money away if you buy a Cornice Mould.

THE MONARCH PATENT CORNICE MOULD

consists of an aluminum frame fitted with the best red birch guides and black cherry handles. It is light and strong. Ten assorted blades and a blade scraper complete the set. Each blade is made of white pine. The edge is of zinc encased in the wood. The pine is specially treated so plaster or water will not affect it. This tool will make straight cornices and perfect corners quicker, easier and better than you have ever seen it done. The saving in time is wonderful and the work beyond comparison. It requires no special skill to use this Cornice Mould. You can handle it as well as I can.

DON'T SEND ANY MONEY

Just send me your name and address. Tell me you want the Monarch Cornice Mould on **Ten Days' Free Trial.** Use it ten days and if it don't please you, send it back, that's all.

Get Your Cornice Mould Quickly by Writing Today

TIMOTHY F. HORAN, 10 Maple St., COOPERSTOWN, N. Y.

The Best Is None Too Good
We Build the Best

A STRONG REASON why you should specify "SEDGWICK" where a hand power elevator or dumb waiter is needed.

THE STRONGEST REASON why you should specify "SEDGWICK" is that it will positively add to your reputation, and thus result in actual profit.

There is a "SEDGWICK" for every place and purpose.

Send for our 1914 catalogue, full of the latest developments in elevator and dumb waiter construction, and the easiest and best methods of installation.

This Band Brake Dumb Waiter is specially designed for use in deep wells where a strong, reliable, easy running Dumb Waiter for hard service is required.

Sedgwick Machine Works
123 Liberty St.
New York City

"Reliable Erie" Reversible Hoist

Doubles Service—Halves Labor
At Fraction of Usual Cost.

For pulling, hauling or lifting both ways; or hauling cars back and forth.

2000 lbs. capacity

Erie Clutch & Pulley Co.
113 W. 12th St.
ERIE, PA.

THE
Excelsior Dumb Waiter

Sent complete, to a nail $18.50
Knocked down, ready to erect

Self-Retaining Machine, Hardwood Car, Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. *Send for Descriptive Pamphlet.*

R. M. RODGERS & CO.
74 Emerson Place, Brooklyn, N. Y.

TRADE NOTES

In the face of very keen competition P. & F. Corbin, New Britain, Conn., secured the contract for furnishing the hardware for the new $14,000,000 Equitable Building now in course of erection on the site of the old structure in lower Broadway, New York City.

Alabastine Company, Grand Rapids, Mich., is meeting with a very gratifying demand for its specialties—Alabastine, the sanitary wall coating, and Alabasco, the washable flat wall paint—the volume of business at the opening of the year being in advance of anything which the company has ever before experienced. We understand that the first working day's shipment of the new year totaled 123,800 packages. It is estimated that if these packages were placed end to end they would reach a distance of 11½ miles and that the goods when mixed with water would cover 860 acres of wall space.

The country is growing better and the old standard epitomized in the phrase "let the buyer look out" is giving way before a more wholesome regard for ethical standards and fair dealing, is the sentiment expressed in one of the leading articles in the January issue of *Graphite*, the trade organ of the Joseph Dixon Crucible Company, Jersey City, N. J.

Berlin Mills Company, Portland, Me., points out that "Bermico" sheathing paper is made from coarse clean fiber without any "filling," and is excellent for insulating purposes, while at the same time affording protection from dampness and moisture. "Bermico" comes in two colors—red and green—and in two weights. In order that the readers of *The Building Age* may demonstrate the practical merits of this sheathing paper the company will gladly send a free sample roll to any responsible architect, contractor or builder who may apply for it.

The Durametal Weather Strip Company, 825 West Washington Boulevard, Chicago, Ill., puts the question to carpenters, builders and contractors why they do not buy weather strips direct from the manufacturer and do their own installing. The company announces a unique plan by which the method suggested can be carried out by those members of the trade and make a profit on the weather strip as well as on the work of installation. The Durametal weather strips are made of heavy zinc and as the name indicates are durable and are fully guaranteed. A few agencies are open to responsible local carpenters and contractors and those who are interested can at the same time secure samples and prices on application to the company.

The Sanitary Chemical Closet System which is said to require no water or sewer connection is being brought to the attention of architects, builders and houseowners generally by the Sanitary Chemical Closet Company, Dept. G, Bradford, Pa. This system is said to abolish the outside open closet vault or cesspool and can be installed inside or outside the building, it requiring only 30 minutes' attention twice a year. To any reader of the paper a booklet relating to the system will be sent free on application.

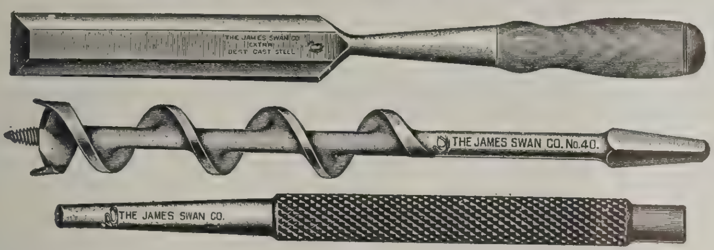
The Cincinnati Paint, Oil & Varnish Club of Cincinnati, Ohio, held its regular monthly meeting and dinner at the Business Men's Club on the evening of January 8. Following the dinner the members of the club were guests of President R. F. Johnston in a theatre party at the Empress Theatre.

The usual profit distribution among its employees is made this year by the Starrett Tool Company, Athol, Mass., the same as for the year previous and the company announces through a circular that the directors have decided to pay "as soon after the first of January, 1914, as practicable to each person in the employ of the company on that date, a sum equal to 2 per cent. of the entire amount of wages paid to such employee during the year 1913." The company expresses the belief that prosperous conditions will prevail during the spring months of 1914.

(*Continued on page* 96)

SWAN

LOOK FOR THE SWAN TRADE MARK


THE JAMES SWAN CO.
THE JAMES SWAN CO. No.40.
THE JAMES SWAN CO.

On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc.

High Grade Mechanics' Tools known to all good workmen

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.

You Will Be Quick

to recognize the value of this

"YANKEE" Tool

PUSH BRACE
No. 75

OIL
"YANKEE" No.75 NORTH BROS.MFG.CO. PHILADA.PA.U.S.A.

Drives a ⅝" hole into white pine or ⅜" into any grade of wood easier and quicker than a bit brace, and gets into tight corners where you can't use the brace. One thrust of the plunger means three revolutions of the bit.

It will take any tool you can put into a brace. Great for driving large screws, tapping small nuts or running them up on bolts. Takes up very little room in your tool box. *Your dealer sells the "Yankee."*

☞ ***Send for the "Yankee" Tool Book anyway***

NORTH BROS. MFG. CO., Lehigh Ave., Philadelphia, Pa.

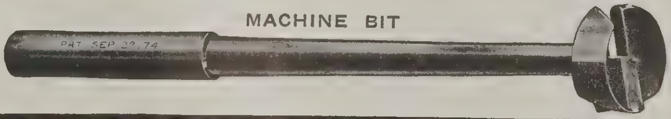
BRACE BIT

Bores any Arc of a Circle

Is guided by its circular rim instead of its center, and can be guided in any direction, regardless of grain or knots, leaving a true polished surface. Will bore a square hole. Unequalled for core boxes, delicate patterns, veneers, screen work, scalloping, newels, ribbon moulding and mortising.

THE PROGRESSIVE MFG. CO., Dept. "A" Torrington, Conn.

MACHINE BIT



1853 BUCK BROS. 1913

BUCK BROS

Buck Brothers' Tools are LASTING tools—they keep their edge.

We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

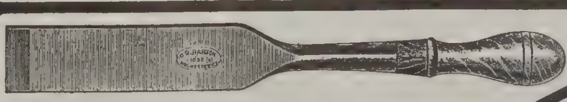
BUCK BROS., Millbury, Mass.

Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS AND DUMB WAITERS
Automatic Hatch Gates
Send for Circulars

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kansas City, Mo., 717 Commerce Building
Gus Taliaferro, Oklahoma City, Okla.
Branch Offices, 136 Liberty St., N. Y. 108 11th St., Omaha, Neb.

MACK & CO.



The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

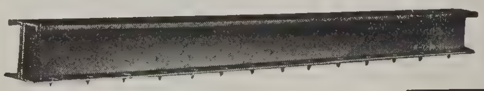
D. R. BARTON 1832 ROCHESTER N.Y.

Brown's Race
Rochester, N.Y.

Something For You

in our Pamphlet 29; viz:
Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.
Some of these Tables are not in print elsewhere.
The Pamphlet and a Mounted Model Hanger will be mailed on request.
SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.



Berger's Metal Lumber Joists
the logical material to take the place of wood joists.

Replaces wood stick for stick.

Write for catalog.

The Berger Mfg. Co., Canton, Ohio
For the best service address the nearest branch
New York Philadelphia St. Louis
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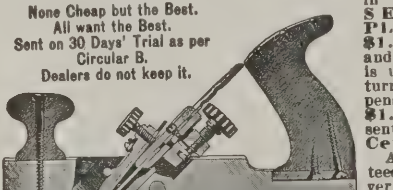
Also manufacturers of Prong Lock Studs and Furring, Rib-Trus, Ferro-Lithic and Multiplex Reinforcing Plates, Metal Ceilings, Expanded Metal Lath, Sidewalk Forms, Raydiant Sidewalk Lights, etc.

INTRODUCTORY TRIAL OFFER
If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particulars, a carpenter's pencil and our $1.00 Certificate, which we will receive as $1.00 in payment for a SELF-SETTING PLANE as stated in our $1.00 Certificate, and if this S. S. Plane is unsatisfactory and returned to us at our expense, we will send you $1.00 more than you sent us, as the $1.00 Certificate says.
As this paper guarantees we will do as our advertisement says, you know the plane must be O K. ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained, enty, knurley, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT. If it is not worth to YOU, OR YOUR MEN, TWICE ITS COST, return it at our expense as above stated.
If you send us the addresses of ten carpenters no matter where they live, we will send you another hard, tough carpenter's pencil.
Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH. If it FAILS, return it and we will return your money.
GAGE TOOL CO., Vineland, N. J.

THE BEST IS THE CHEAPEST
None Cheap but the Best.
All want the Best.
Sent on 30 Days' Trial as per Circular B.
Dealers do not keep it.



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Investigate ! ! !

White's Improved Level
before buying elsewhere.
This level is especially designed to meet the contractor's every need in the level line. Over 3000 giving perfect satisfaction. Telescope long and powerful and will detect an error of 1/16" in 300 feet. Shipped on approval to your address, express charges prepaid. Write today for circular X, giving price and full information. Written guarantee with each level.
DAVID WHITE COMPANY
Dept. B
419 East Water St. Milwaukee, Wisc.

James A. Galvin, architect, removed on the first of January to his new offices at No. 28 Van Derwerken avenue, Cohoes, N. Y.

The No. 430 Rapid Acting vise comes in for discussion in the January issue of *DooR-ways*, the trade organ of the Richards-Wilcox Manufacturing Company, Aurora, Ill. This implement is so constructed that the course adjustment upon the material to be gripped can be accomplished instantly, after which the desired pressure may be applied to hold the object in position.

A special issue of the *Philistine*, edited by Elbert Hubbard, and devoted to the interests of the Simonds' saw, appears under the date of January, 1914, and attempts to present the merits of this well-known product in the inimitably whimsical style of the author. While frankly conceding the purpose of its mission, this number of the *Philistine* conforms in general style to the regular issues of the little periodical which has been published by Mr. Hubbard for so many years, and, while the reader will not be greatly enlightened as to the details of manufacture and materials which have brought the Simonds' product into prominence in the trade, a perusal of its contents will probably create a good-natured interest in the mind of the prospective purchaser.

The interested purchaser of spray pumps and fittings, hayloading tools, windmill force pumps and other agricultural equipment will undoubtedly give a space on his office wall to the new 1914 calendar just issued by F. E. Myers & Bro., Ashland, Ohio, as a constant reminder of its products. A very large number of the specialties manufactured by this firm are illustrated on the calendar sheet, which thus presents a pictorial catalogue for handy reference.

Yaeger Machine Company, 216 West Rich Street, Columbus, Ohio, makes announcement that its 1914 model of the "Big-an-Little" concrete mixer is ready for the trade and that it will be exhibited at the Chicago Cement Show, February 12 to 21 inclusive. Emphasis is laid upon the fact that contractors have reached the conclusion that it pays better to have one or more small portable mixers than to mix by hand or to make use of a large, clumsy mixer.

A calendar for 1914 in which are illustrated in well executed colored half-tone cuts several kinds of reinforced concrete structures in constructing which Universal Portland cement has been used, has just been issued by the Universal Portland Cement Co. An especially attractive illustration is that representing one of the golf shelters at the Jackson Park golf links in Chicago. Another shows an attractive residence at Lake Forest, Ill.

Arthur T. Remick, architect, formerly of 103 Park avenue, has become associated with Henry Wilhelm Wilkinson, and the practice of architecture will hereafter be conducted at 15 West 38th street, New York City.

R. F. Johnston, president of the R. F. Johnston Paint Co., Cincinnati, Ohio, announces that the recent increase in the capital stock of the company from $100,000 to $150,000 was to provide additional funds to be used in the expansion of the company's business. In a comparatively short time the company has extended its trade until it now has customers in practically all parts of the country.

In finishing the woodwork of the modern home it is sometimes desirable to produce a mahogany effect, and the Lowe Bros. Company, 518 East 3rd Street, Dayton, Ohio, is offering a finish of this nature which it is claimed will not fade. In order to produce the effect it is only necessary to use a coat of the company's non-fading dark mahogany oil stain, then a coat of its mahogany glaze, after which a coat of the makers inside rubbing finish is applied. The result is said to be a full rich color and the effect is that of solid mahogany. A specification book giving the essential facts for preparing specifications on varnish and paint can be had by any reader of *The Building Age* on request.

THE BUILDING AGE

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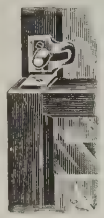

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A Safeguard for Ventilating Rooms, allowing windows to be left open at the top, the bottom, or both top and bottom, with entire security against intrusion.

Descriptive circular mailed on application

THE H. B. IVES CO.

SOLE MANUFACTURERS NEW HAVEN, CONN.

Waterproofed Parquetry

By recently invented equipment we treat with a waterproofing mixture the cloth on underside of all our Parquetry Borders and Fields, which tends to prevent the material from taking up moisture by contact from beneath.

Sample will be sent on request.

Ask for estimates and Colored Floor Plates

The Interior Hardwood Co.
Indianapolis . Indiana .

Samson Spot Sash Cord

Reg. U. S. Pat. Off.

Made of extra quality stock, carefully inspected and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.

The Spots on the Cord, in any color, are our trade mark. Don't be misled by imitations.

Samples and full information gladly sent.

Reg. U. S. Pat. Off.

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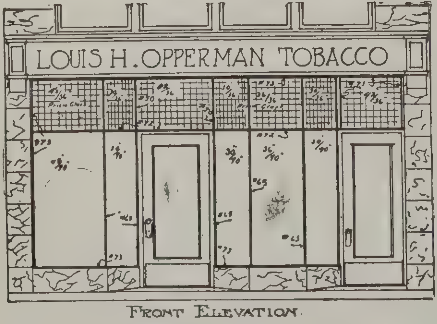

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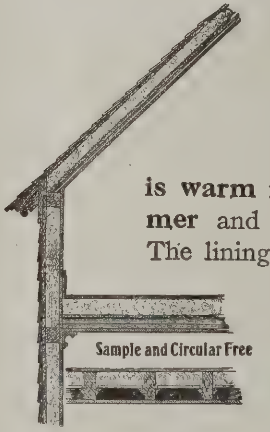

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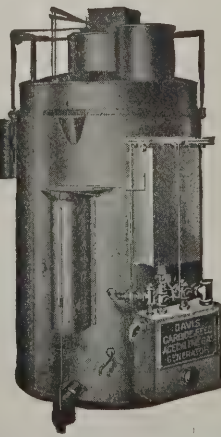

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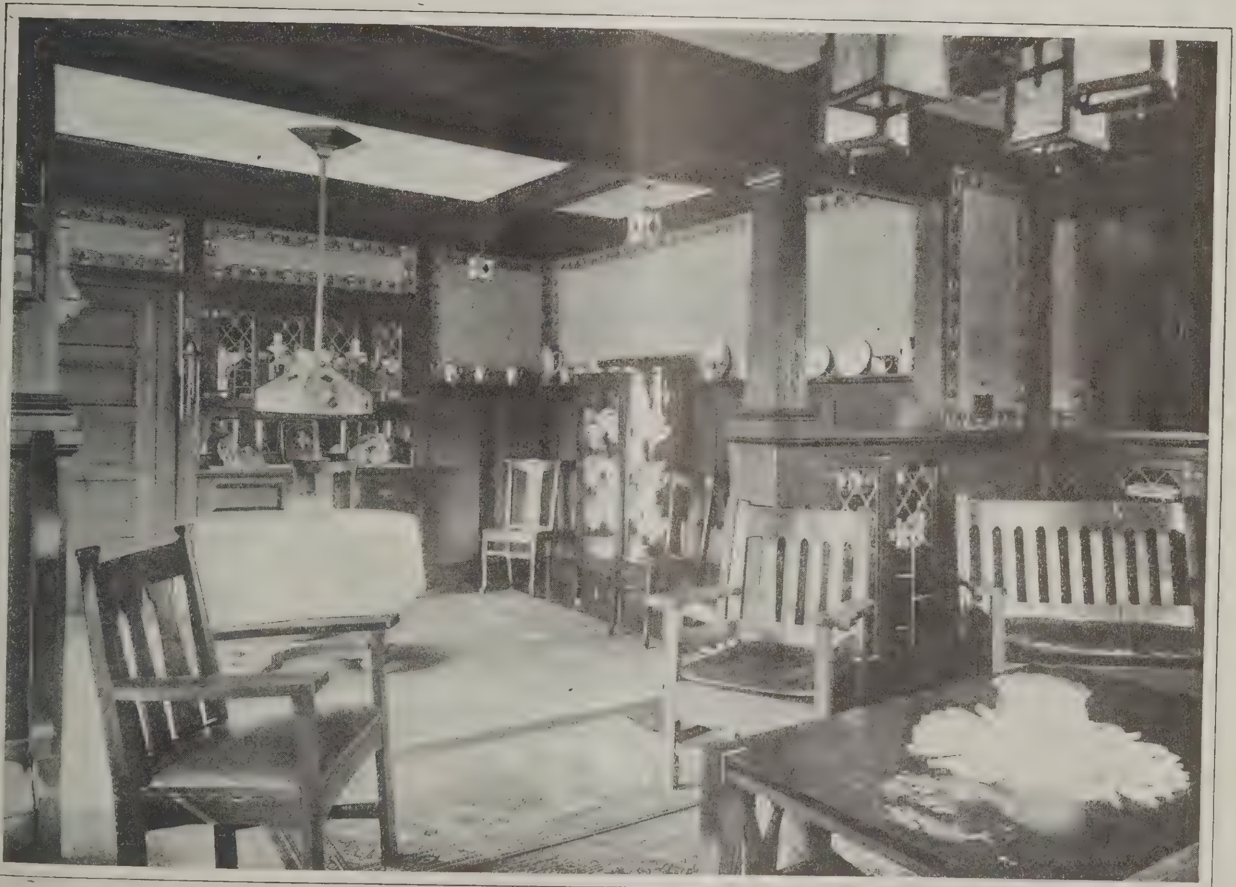
THE BUILDING AGE

NEW YORK, MARCH, 1914

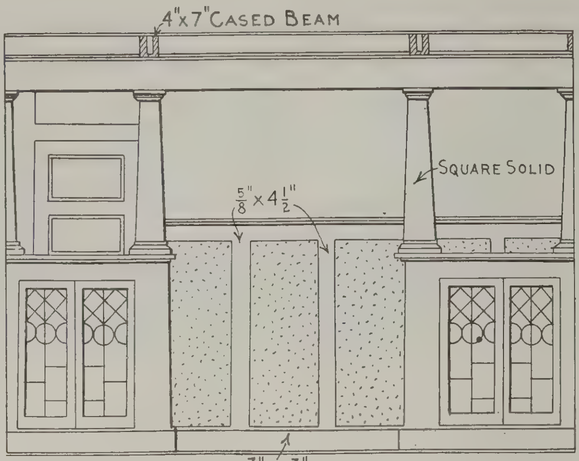
A Modern Cottage on the Jersey Coast

A Clever Combination of Materials in the Exterior Treatment—The Sleeping Balcony—Details of Construction

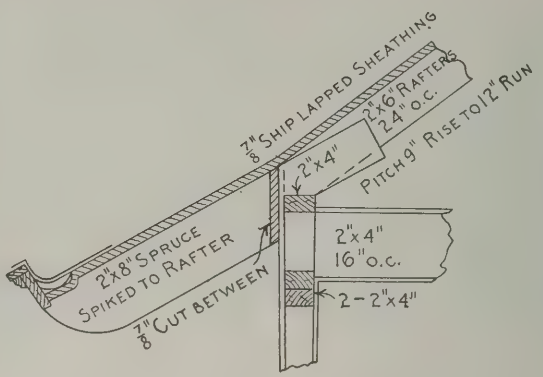
THE increasing popularity of the sleeping balcony or porch at the present day in connection with our modern homes is only another evidence of the tendency toward a better understanding of the requirements of health and hygiene. Dwellings without number have been and are being erected with provision for an out-door sleeping space located most frequently perhaps at the second story level and an excellent example of this character is presented in the pages which follow. This cottage, which may be regarded as of the semi-bungalow type, is pleasantly located on the Jersey coast, where the bracing air of the broad Atlantic is wafted inland over a far stretching area. In addition to the balcony, which may be utilized for out-door sleeping purposes, the external features of this home include



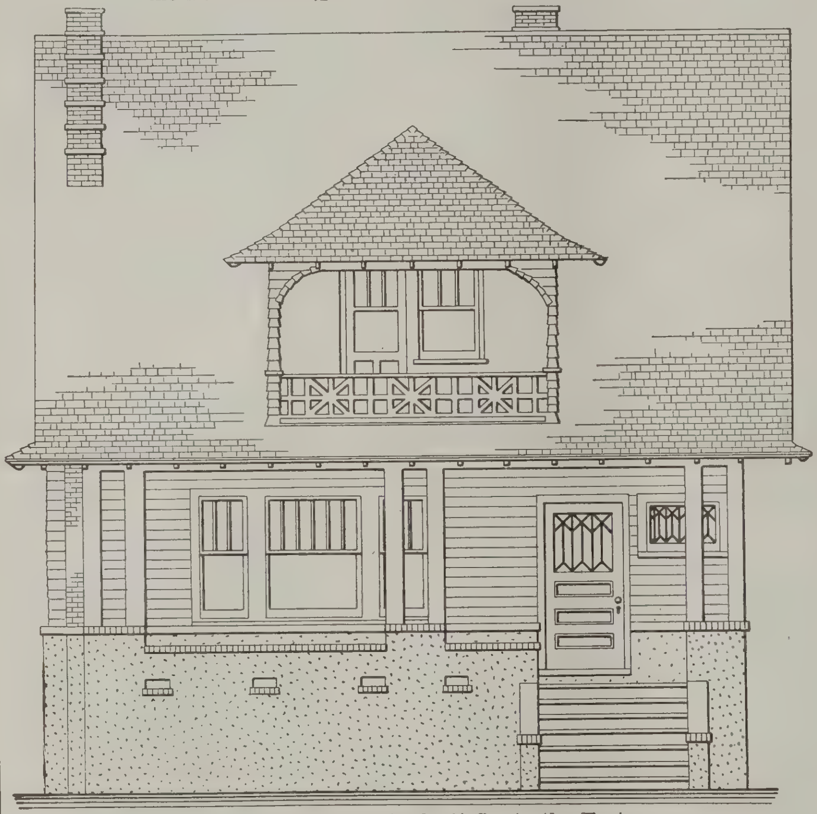
The Living and Dining Rooms Looking Toward the Built-in Buffet and Showing Door to Pantry Just at Its Left—Architect, L. Jerome Aimar, Navesink, N. J.



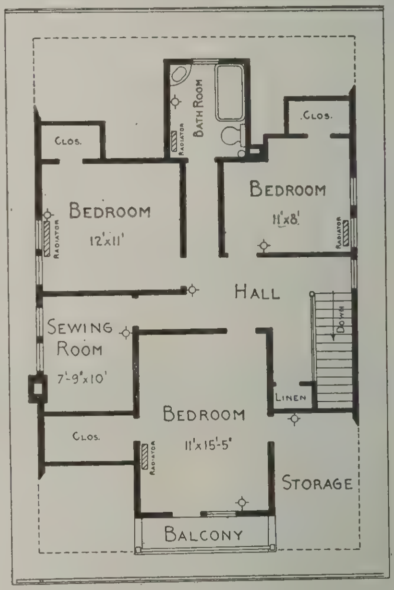
Details of Cased Opening Looking from Living Room into the Hall—Scale ¼ In. to the Foot



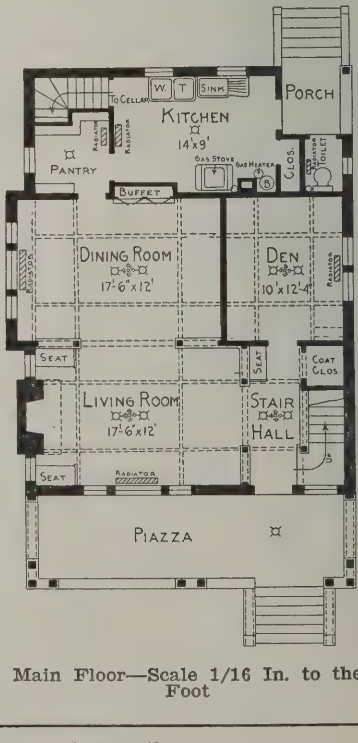
Details of Main Cornice Showing Construction—Scale ½ In. to the Foot

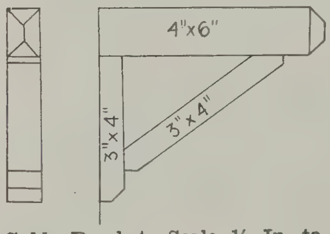


Front Elevation—Scale ⅛ In. to the Foot

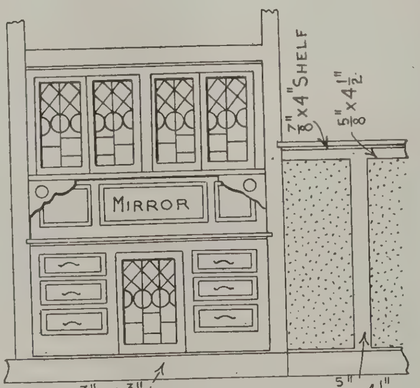


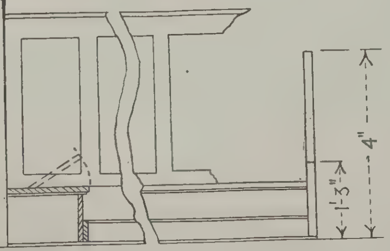
Second or Attic Floor—Scale 1/16 In. to the Foot





Gable Bracket—Scale ½ In. to the Foot





Details of All the Seats

Elevation of the Built-In Buffet in the Dining Room

Main Floor—Scale 1/16 In. to the Foot

A Modern Cottage on the Jersey Coast—Elevation, Plans and Details the stucco finish, hollow tile foundations extending upwards to the sills of the first story windows, the shingled dormers and gables in combination with the siding below; the veranda with its impressive columns, running across the front of the cottage and the outside chimney of red brick construction.

Interiorly the arrangement is compact and somewhat out of the ordinary. The living room and dining room, as may be seen from the half tone view on page 19 are practically one, the separation being simply the seat at the left and the cabinet case at the right extending to the hight of the wainscoting. In the living room the feature is the fireplace constructed of field and peanut stones laid up in white mortar and lined with brick. Directly beyond the stair hall is a coat closet, facing which is a convenient seat. Beyond this is the "den." In the dining room is a built-in buffet clearly shown in the picture just mentioned, and at the left is the door leading to the pantry by means of which communication is established with the kitchen. It will be noticed that the kitchen and the pantry occupy practically the entire width of the house at the rear and from the kitchen lead the stairs to the cellar. Another noticeable feature is the toilet room opening directly from the rear porch.

On the second floor are three sleeping rooms, a sewing room and bath room. The linen closet opens from the hall near the main flight of stairs and not only has the front bedroom a commodious closet but leading from it there is also ample storage room under the roof. It is from this bed room that the sleeping balcony is reached.

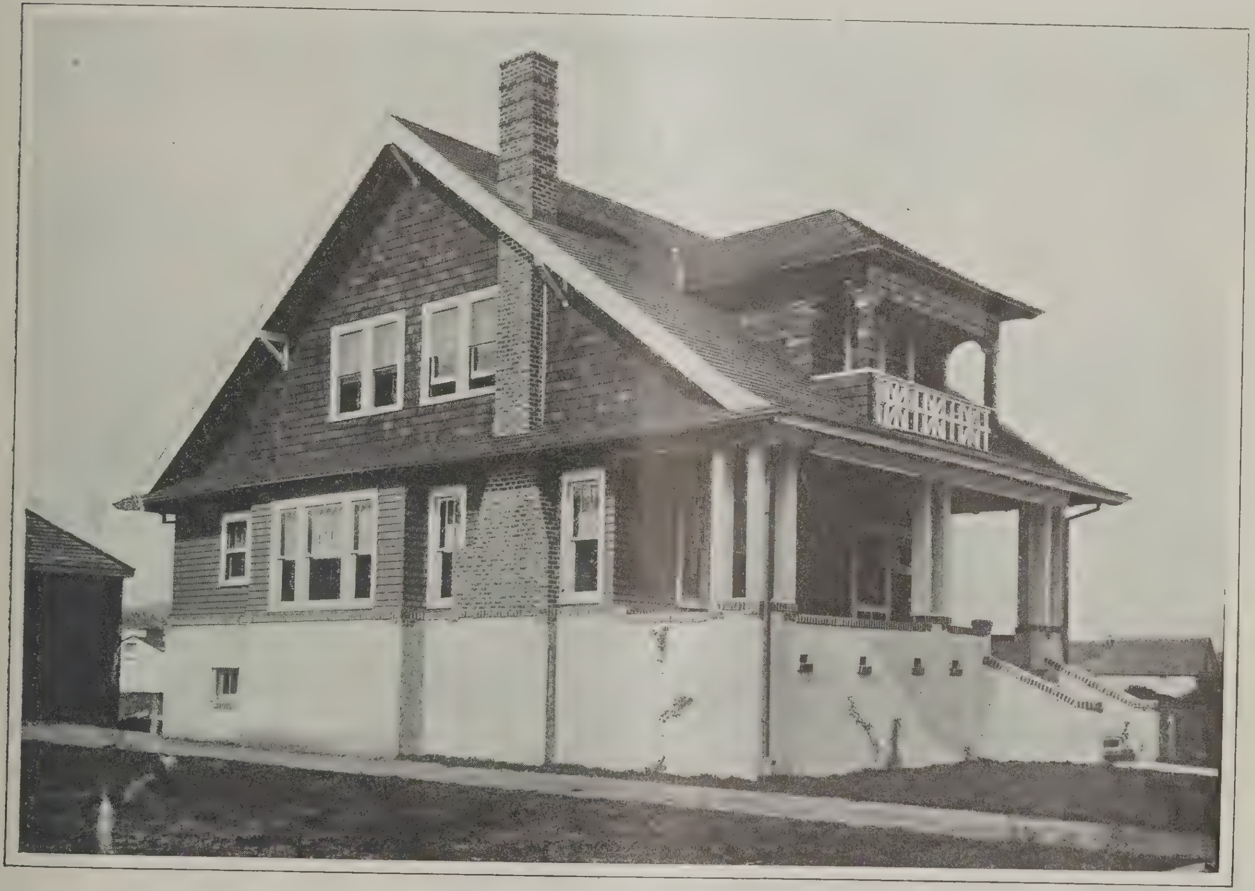
The cellar extends under the rear section only of the cottage, the other portions of the building resting upon trench walls, the footings for which, as well as for the cheek walls of the piazza, are of concrete 12 in. wide and 6 in. deep. The concrete consisted of a 1:1:2 mixture to which was added 2 lb. of "Impervite" for each cubic foot.

The cellar bottom was covered with 3 in. of this mixture and finished with 1 in. of cement and sand, facing over with ¼ lb. of "Impervite" to each sq. ft. of surface.

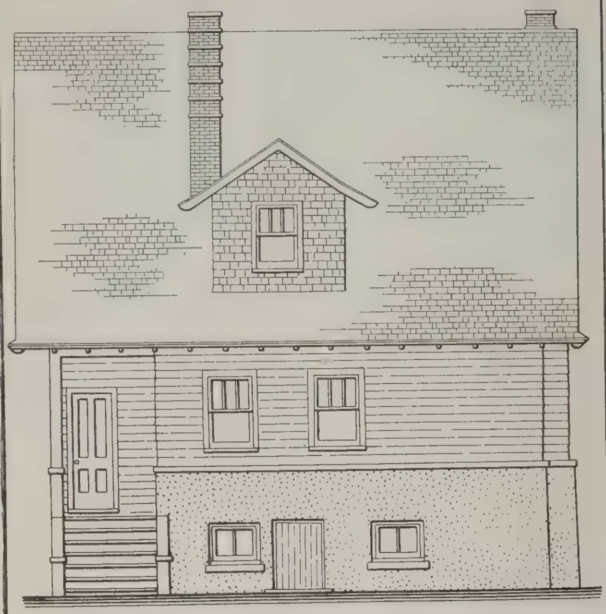
The walls are of hollow tile 8 in. thick and laid up in cement mortar composed of one part Portland cement, 3 parts sharp sand, all joints being slushed fully and thoroughly pointed to aid in making all water tight. To this mortar four gallons of "Impervite" were added to each bag of cement and troweled on ¾ in. thick on the outside and inside of the cellar walls, forming rounded corners and angles and finishing 4 in. above grade. Above this point the walls are finished in cement and finishing lime stucco both inside and out.

The tops of all walls and piers are finished with a row lock course of bright red brick projecting 2 in. over the outside face of the walls and laid up on the face side with white lime mortar with joints 1 in. wide. Next inside the face of the walls is laid, edge on, a stretcher course of brick to finish to inside face of wall. The sills of the cellar windows are formed of row-lock courses same as above. The piers under the building finish 7 in. below top of walls for receiving a 4 x 8 in. girder under beams.

According to the specifications of the architect the framing timbers are of hemlock with the exception of the floor beams which are of spruce. The

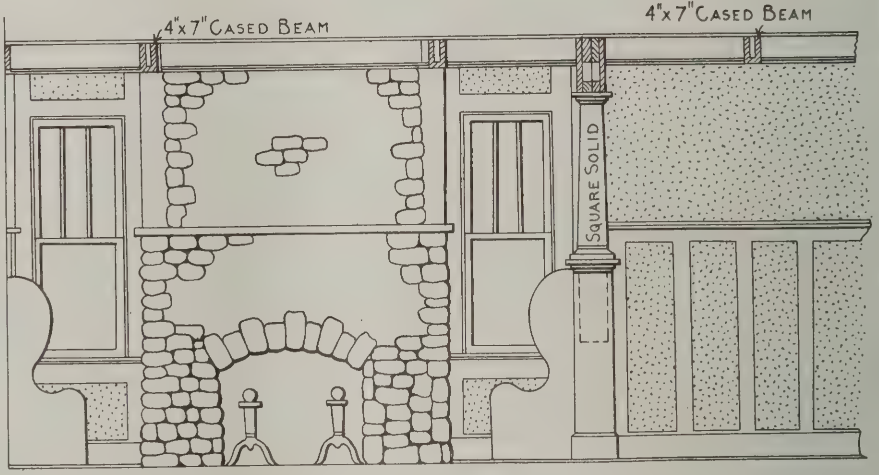


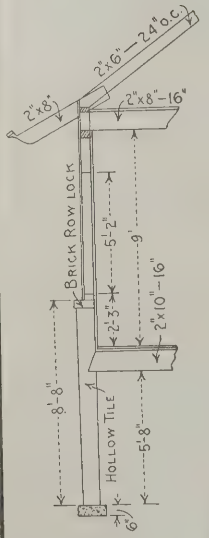
A Modern Cottage on the Jersey Coast—A Photographic View of the Home of H. A. Sculthrop at Highlands, N. J., Clearly Showing the External Treatment and Sleeping Balcony sills or wall plates are 2 x 6 in. secured to the walls by means of 12 bolts each ¾ in. in diameter running through and cemented in the top courses of tile and having washers on the bottoms and screw nuts on the tops. The outside and partition studs are 2 x 4 in. placed 16 in. on centers. The first floor beams extending under partitions are 2 x 10 in., the second floor beams 2 x 8 in., and collar beams 2 x 6 in., all placed 16 in. on centers. The floor beams are tied to the walls by means of strap hangers every 4 ft. The main rafters are 2 x 6 in.; the valley rafters 2 x 8 in., and the piazza ceiling beams 2 x 4 in., all placed 24 in. on centers. The piazza sills are 2 x 8 in.; the bearers are 4 x 6 in. built into the tile walls and over which rest the 2 x 8 in. purlins placed 20 in. on centers. The first floor girder already mentioned is 4 x 8 in. and spliced over the piers. All plates are 2 x 4 in. doubled. Each tier of floor beams has rows of 1 x 2 in. cross bridging. All trimmers and headers carrying more than two tail beams are double and beams under all partitions



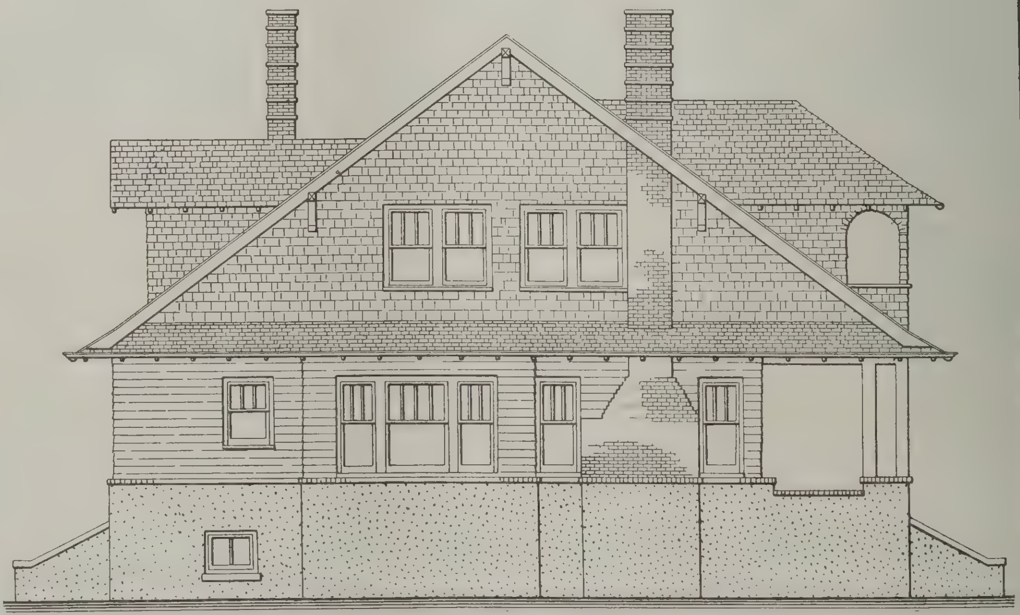
The Rear Elevation—Scale 3/32 In. to the Foot

The Chimney Side of the Living Room Showing Rustic Stone Fireplace with Seats and Windows on Either Side. Scale ¼ In. to the Foot





Section — Scale ⅛ In. to the Foot

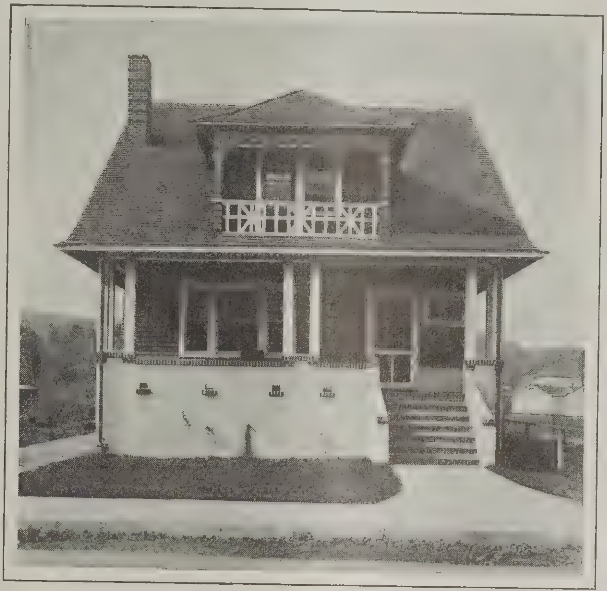


Side (Left) Elevation—Scale 3/32 In. to the Foot

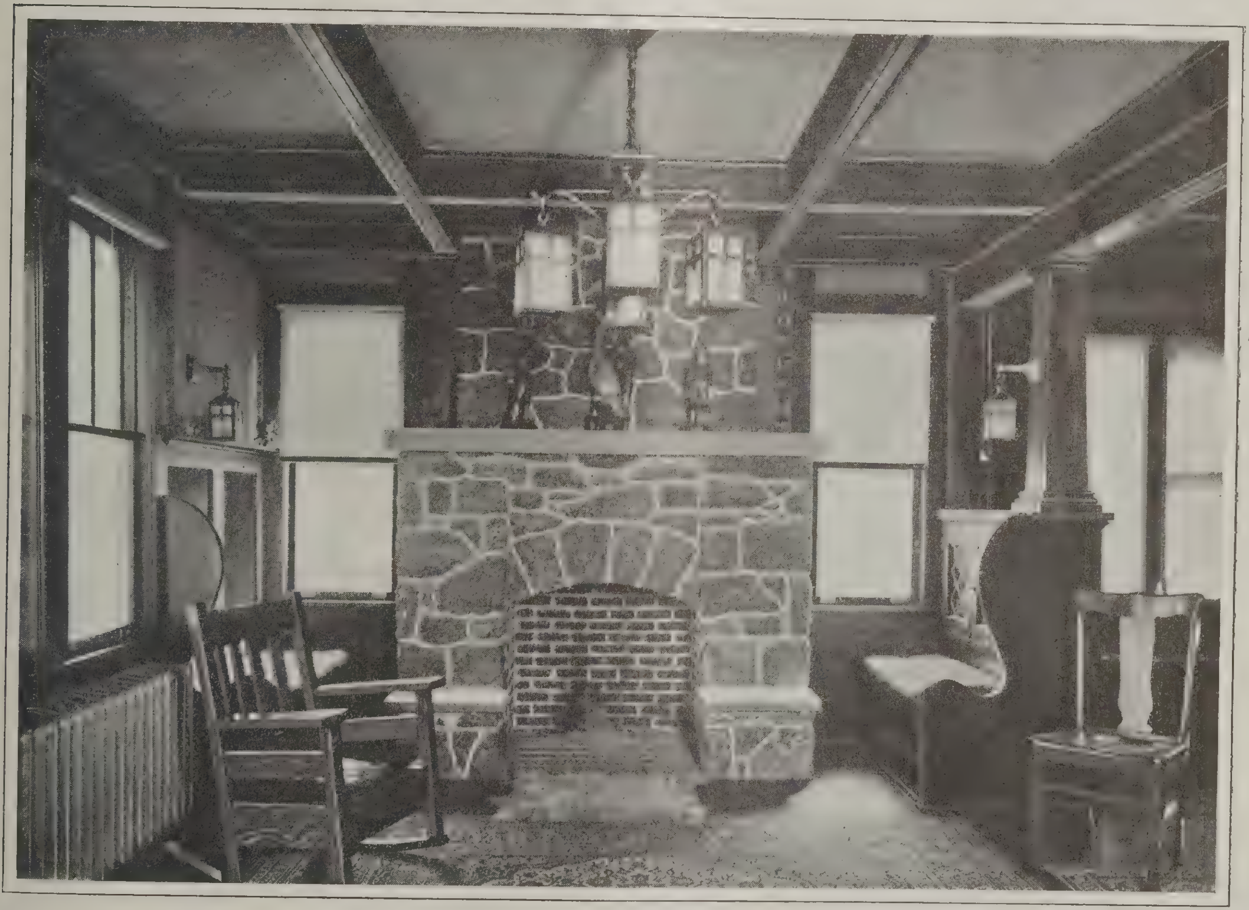
A Modern Cottage on the Jersey Coast—Elevations and Miscellaneous Details running the same way are double to give strength.

All exterior side walls of the cottage above the tile walls including cheeks of dormers, etc., and all roofs are covered with ⅞ x 10 in. shiplap North Carolina pine surfaced boards. Over the cap course of the tile walls the sheathing boards are covered with two ply building paper over which for the first story is laid beveled red cedar siding exposed approximately 4½ in. to the weather.

Above the level of the first story ceiling the outside of the cottage is covered with 18 in. red cedar shingles exposed 6 in. to the weather. The hoods across the sides of the building are ceiled on top of the rafter feet and covered with shingles laid 5½ in. to the weather. The roofs of the main building and the dormers are covered with asbestos shingles.



A Directly Front View of the Cottage



The Open Fireplace in the Living Room with Windows and Seats on Either Side, the Lantern Type of Lighting Fixtures and the Beam Ceiling Effect

A Modern Cottage on the Jersey Coast—L. Jerome Aimar, Architect, Navesink, N. J.

It will be interesting to the builder to note that the wall plates project 2 in. outside of the studding which is set flush with the inside of the plates and the first board of sheathing laps over the plate to the brick course of the wall, forming a "bell cast" over which the siding lays solidly at these points.

The piazza plates are cased in over the columns 8 in. deep and shingled over and up under the eaves, the same as the sides of the building. The columns are 8 in. square made of solid timber and secured to the piers below by means of ¾ in. bolts built into them. The piazza and porch are ceiled with ⅞ x 3½ in. North Carolina ceiling, showing 8 in. fascia below the ceiling. The balcony is finished same as the piazza.

The sash throughout the house is 1½ in. thick and glazed with first quality American sheet glass. All sliding sash are hung with braided cotton cord and balanced with cast iron weights. The small sash in the toilet room is hinged to open inwards. All sliding sash is fitted with "Ives" sash fasteners. The glass doors of the buffet in the dining room and the living room are 1¼ in. thick of selected Gulf cypress and glazed with crystal glass leaded in.

The front door is veneered with oak on the outside and birch inside and is hung with three loose pin butts. The outside kitchen door is of white pine. All interior doors are selected cypress of the five panel type.

The chimney flue for the living room is of hollow tile carried up to the hight of the walls of the building above which the flue is of hard burnt red brick lined with flue tile.

All side walls above the tile as well as partitions and ceilings are lathed with spruce, and covered with Kings Windsor cement plaster in what is known as "laid on work" and finished with a coat of "Tiger" brand finishing lime mortar brushed and troweled to a smooth hard finish.

The floors are double, the under one throughout the first story being of 7/8 x 10 in. shiplap boards laid diagonally with joints cut on the timbers while the finish floors throughout the first story are of edged grain Southern pine with 7/8 x 2 in. face. A border to the flooring 18 in. wide is laid around the living room, dining room, stair hall and "den." This was formed by laying two strips next to the wall; then diagonal strips 10 in. wide and again two strips. The floors throughout the second story are 7/8 x 3 in. North Carolina pine. The porch and piazza floors are of 7/8 x 3 in. white pine laid in white lead. The balcony floor is covered with heavy duck.

The stair treads are of North Carolina pine 1 1/8 in. thick; and the risers and strings are 7/8 in. cypress. The treads and risers are tongued and grooved together and are housed into the strings. At the second floor landing is a 4 in. solid newel post of cypress.

The trim throughout the first floor is of selected cypress, the casings for all openings being 5/8 x 4 1/2 in., as shown by the details with plain faces and square edges. The casings run from top of base to skirt board around ceilings. Over the columns in the openings between the hall and living room and between the latter and the dining room is a plain wide head casing forming the entablature extending up 1/2 in. above the lower edges of the cased beams so that the picture molding covers the joint between the casing and skirt board.

The plastered panels throughout the side walls under the plate shelf are framed with plain 5/8 x 4 1/2 in. cypress strips, for nailing which three runs of strips were cut in between the studding. The panels are approximately 16 in. wide except under the windows where the panels are full width of openings between the casings, thus forming horizontal instead of vertical panels.

The trim for the window and door openings throughout the second story is 7/8 x 4 1/2 in. with rounded edges, mitered over the heads.

In the kitchen is a two-part iron enameled wash tray with roll rims; also an enameled sink 20 x 30 in. in size and having enameled drain board with integral back same hight as that of the sink.

In the bath room is a 3 in. roll rim 5 ft. enameled iron tub with nickel plated fixtures; an oval bowl supported by concealed wall hangers and a porcelain syphon jet water closet with white enameled seat and cover and porcelain enameled low down tank. The water closet in the toilet opening from the rear porch is the same as that in the bath room except the tank, seat and cover are of dark wood.

The house is piped throughout for gas and wired for electric lighting. There is an outlet in the kitchen for the gas range and one in the fireplace for the gas log. The system of electric wiring was installed in conformity with the rules of the Board of Fire Underwriters.

The cottage is heated by a hot water system and the radiation as figured by the architect is given as 484 sq. ft.

Gutters across the front and rear of the house are lined with 12 oz. copper, and copper is also used for the flashings. The same weight of copper 20 in. wide is laid in all valleys.

All outside wood work except the shingles was given two coats white lead and linseed oil. The under sides of all overhanging roofs were painted a dark brown to emphasize the shadows.

The floors throughout the first story were treated with Berry Bros. paste filler to match the color of the wood and then given two coats of Berry Bros. liquid granite finish. The woodwork of the stairs was treated the same as that of the rooms.

This cottage is pleasantly located at Highlands, N. J., overlooking the broad Atlantic, and was erected for H. A. Sculthrop in accordance with plans drawn by L. Jerome Aimar, architect, with offices at Navesink, N. J., and Newark, N. J.

◆

New York Building at Panama Exposition

A short time ago we referred somewhat at length in these columns to the design which had been prepared for the New York State building at the Panama-Pacific International Exposition, and under date of January 22 we are advised that Neil A. McLean, of San Francisco, had been awarded the contract for the building and that work would be commenced by the first of February. The New York building is to cost $300,000 and will have its exterior walls covered with plaster harmonizing in color with the imitation Travertine marble of the Exhibit Palace walls. The main entrance will be 80 ft. wide and the front of the pavilion will be ornamented with a row of columns 44 ft. wide. A ball room 75 x 100 ft. will be built on the ground floor, also a restaurant.

All of the interior woodwork will be of California redwood and the building will be surrounded by beautiful beds of flowers.

The structure, designed by Charles B. Meyers, of New York City, will be four stories high and have a frontage of 250 ft. with a depth of 100 ft.

◆

Cincinnati Sheet Metal Club

The Cincinnati Sheet Metal Club was formally organized at the Business Men's Club, Cincinnati, Ohio, on the evening of January 19, with an initial membership of 35. The formation of the club was for the purpose of arranging for the entertainment of the National Association of Master Sheet Metal Contractors, whose annual convention will be held in Cincinnati in the second week of June.

The officers are: President, E. W. Edwards; secretary, Ferd. F. Verges; assistant secretary, C. L. Smith; treasurer, Charles F. Pfau. The chairman of the publicity committee is G. D. Myers. A number of members suggested that the club be made a permanent organization.

Hoisting Rigs for the Builders' Use—VI.

Some Particulars of the "A-Frame" and of Various Other Styles of Rig Which Can Be Utilized to Advantage

By Edward H. Crussell*

THE "A-frame" is another hoisting device that is made in many different shapes and sizes, Fig. 33 showing it in its most simple form. The larger sizes require more bracing than is shown in this sketch, and in one of the many different arrangements the frame is provided with a cap and the two legs are kept a short distance apart at the top instead of being close together. The A-frame is an easily made and very useful device for the builder. It is used for much the same purpose as the gin pole, but on account of the spread of the legs at the bottom less guys are required—generally not more than two, both of them running to the rear with sufficient spread to prevent the frame from toppling sideways. The top of the A-frame is leaned forward from the perpendicular to give clearance to the load and to prevent the weight of the guy lines pulling it over backward. With a large A-frame another guy line, called a "lazy guy," is run out forward to prevent such an occurrence.

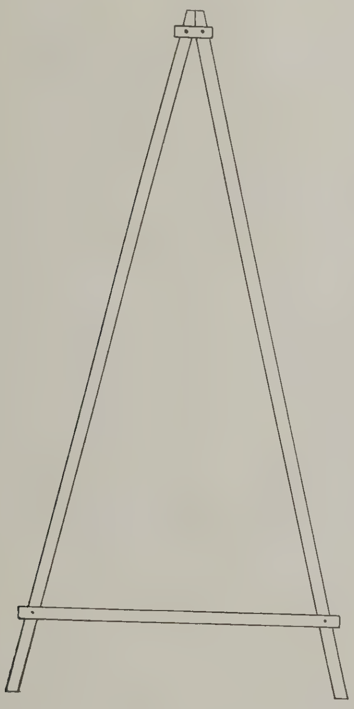


Fig. 33—An "A-Frame" Derrick

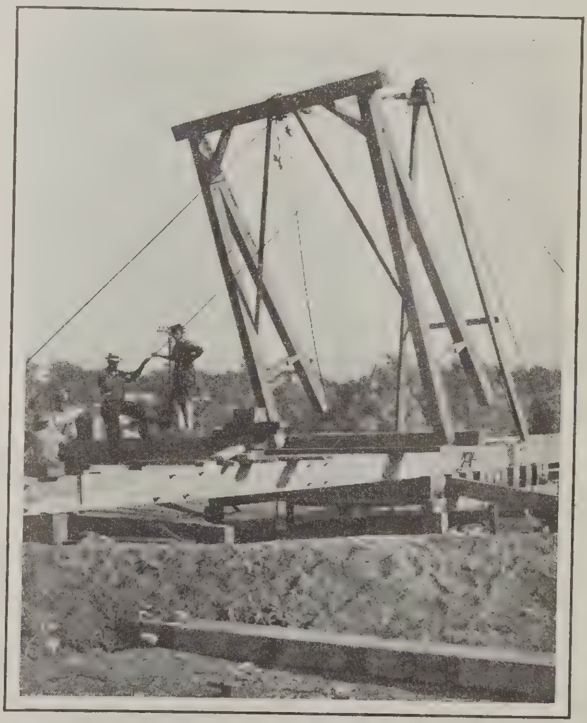


Fig. 34—An "A-Frame" Derrick in Use

Hoisting Rigs for the Builders' Use—VI—One Style of Derrick Quite Common in Current Practice

One of the great advantages of the A-frame is the ease with which it lands its load. Supposing it to be set on the flat roof of a building for the purpose of hoisting material up the outside walls, the foot of the A-frame would be stationed two or three feet inside the coping and the top allowed to project sufficient for the load to clear. As soon as the load is high enough a slight pull on the guy lines will bring the frame to a perpendicular position and by slacking off on the hoisting line the load is deposited on the roof without further trouble. For work of this character either a forward guy or a back stop should be used.

The scheme outlined in the foregoing paragraph is useful for more than landing material on the roof. The writer once put a bell weighing 2200 lb. in through a tower window in this manner. The A-frame was set up on the roof of the tower and when the bell arrived at the hight of the window the frame was drawn back until the tackle touched the wall. This brought the bell partly into the window when some timbers were then projected from the window beneath the bell with their inner ends resting on the floor. By slacking off carefully on the tackle the timbers made a slope down which the bell was easily rolled on some pieces of ¾-in. steam pipe. This is only one instance, but the

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*Copyright, 1914, by Edward H. Crussell

A-frame is a favorite rig with the writer for emergency work and he could easily cite plenty of other cases, Fig. 34 being one of them.

In Fig. 35 is presented a modification of the A-frame. This in some localities is called a "setters' derrick," but the principle upon which they both work is the same.

For light loads one of the best rigs working on this principle which the writer has ever seen is illustrated in Fig. 36. It was made of a 16-ft. length of 1½-in. steam pipe. A plug was welded into each end of the pipe and then drawn to a point, after which the pipe was bent to the shape of an inverted "U" as shown in the sketch. The center of a rope long enough to make two guys was attached to the top of the rig in such a manner as to provide a bight for the hook of the block. The rig could then be used the same as the A-frame.

When not in use this device occupies but little space and could be easily carried from place to place or stored away. Of course, a simple fixture for fastening the guys and tackle could be "clipped" to the top of this contrivance if thought necessary; also a pipe of a larger size could be used and a hinge connection designed for the foot to take the place of the points.

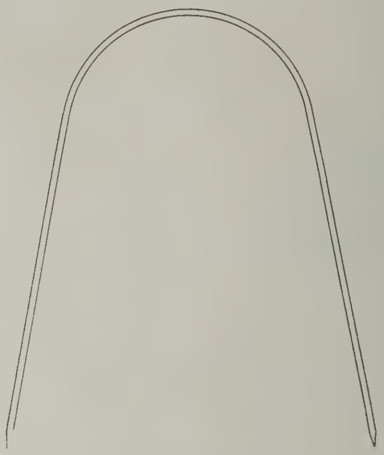


Fig. 36—Hoisting Rig Made of a Length of 1½-in Steam Pipe

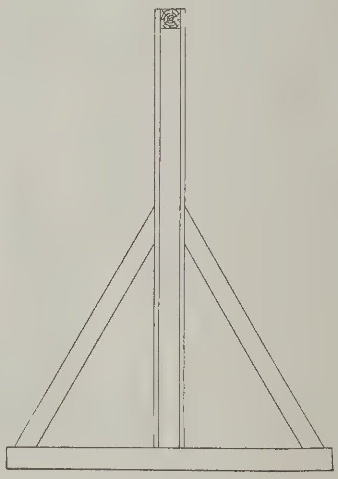


Fig. 38—End Elevation of Fig. 37 When Braced with Timbers Instead of Lines

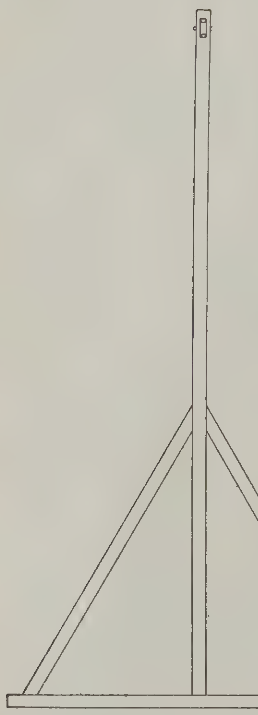


Fig. 35—A "Setters" Derrick Which Works on the Principle of the "A-Frame"

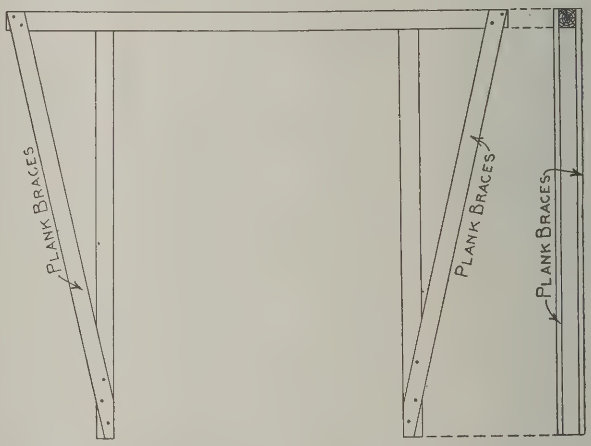


Fig. 37—Front and End Elevations of Hoisting Rig for Short and Heavy Lifts

Hoisting Rigs for the Builders' Use—VI—Various Forms for Light and Heavy Work

In Fig. 37 is illustrated a hoisting rig that is principally used for very heavy work which does not require to be lifted any great hight. It can be set up in a leaning position and held in place with guys the same as the A-frame, or it can be set up plumb and braced rigidly with other timbers as shown in the end elevation, Fig. 38.

The manner in which the sway braces are arranged in Fig. 37 may be new to some of the readers of *The Building Age*, and to the novice this style of bracing sometimes appears inadequate for the purpose. The braces are placed, of course, in the manner indicated to give more clearance between the upright posts, and if the timbers are correctly proportioned and the joints properly fastened this method of bracing is just as effective as that in which the braces run to the center of the cap.

The writer once saw a contractor erect a rig of this kind at a small way station for the purpose of unloading some heavy dredging machinery. The machinery was loaded in what are known as gondola cars which are open at the top and have sides about 5 ft. high. The apparatus was wide enough to span the car and leave space enough for a dray between the side of the car and one of the legs. Two sets of chain blocks were used, one over the car and the other over the dray. The load was first lifted clear of the car with one set of blocks, the other was then attached and by slacking off on one and hauling in on the other the load was soon changed from this position over the car to one over the dray on to which it was lowered and sent on its way to the point where the dredge was to be assembled. Men who have much of this class of work to do soon become very expert in devising, erecting and operating contrivances of this kind.

The traveling gantry used in the erection of steel truss bridges is on the same principle as that shown in Fig. 37, but much larger and more elaborate.

Fig. 39 illustrates one used by the Southern Pacific Railway Company in the erection of a drawbridge over the Sacramento River. Fig. 40 represents a part view of the completed bridge with the "traveler," as the bridge workers call it, standing in the center. The traveler is built to run upon rails the full length of the structure that is to be erected and derives its power from one or more hoisting engines which are stationed at some convenient point. The upper blocks of the tackle are fastened with slings to timbers at the top of the traveler and the fall lines are led through the necessary snatch blocks to the drum of the engine. The upper block or the timber to which it is fastened can be changed from place to place to suit requirements or conditions.

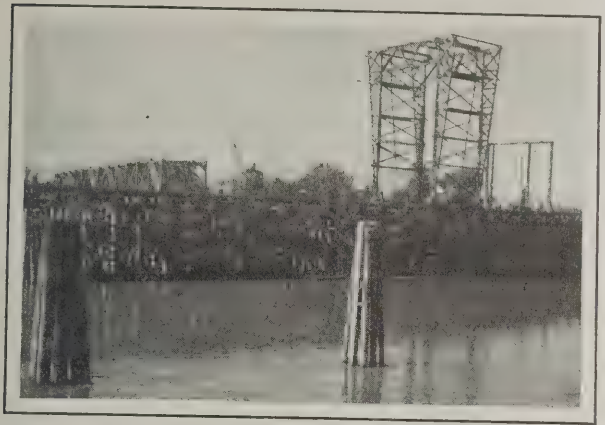


Fig. 39—"Traveler" Used in the Erection of a Steel Truss Draw Bridge Over the Sacramento River

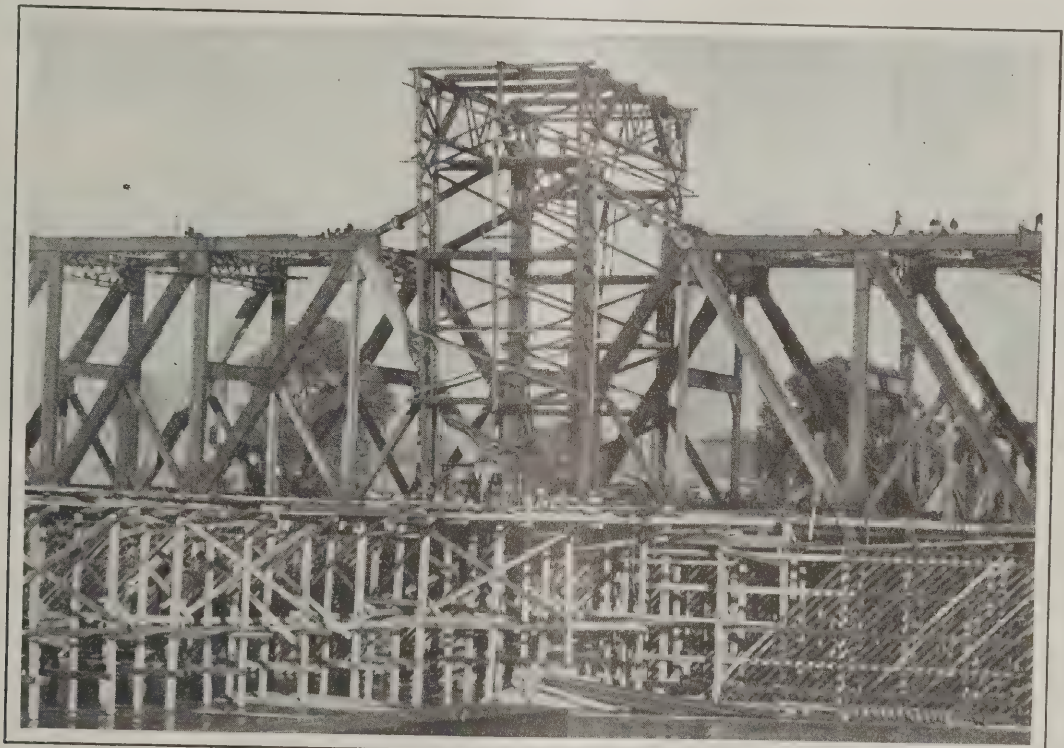


Fig. 40—Showing the Completed Bridge with "Traveler" in the Center

Hoisting Rigs for the Builders' Use—VI—Showing How the "Traveler" Is Utilized in Trestle Work

A hoisting device that can sometimes be used for short lifts is a form of enlarged saw horse. The writer was once called upon to construct in a hurry some sort of hoisting rig to assist in setting the corner stone of a large building. He made a saw horse about 8 ft. high with 4 x 6 in. legs and a 4 x 12-in. top. From this the corner stone was suspended by a set of chain blocks, and, as the newspaper man had it, "the ceremony was performed without a hitch."

(To be continued.)

Creamery with Hollow Concrete Walls

In our description last month of a creamery with hollow concrete walls the statement was made in the second paragraph of the first column on page 70 that at one time during the progress of the work "the thermometer went as low as 20 degrees below zero." The part of the sentence quoted should have been printed without the words "below zero," as it is obvious that it would hardly have been feasible to conduct any kind of building operation, and particularly one with concrete, when the temperature was as low as that indicated.

Boycotts and the Labor Struggle

Those who desire to familiarize themselves with the legal rights of employer and employee are likely to be interested in a volume entitled "Boycotts and the Labor Struggle," by Harry W. Laidler, a member of the New York Bar, and published by John Lane Company. The author traces the interesting origin of boycotting; describes its employment in America both by traders, employers and workingmen; examines the present status of the common and statute laws both on trade and labor boycotts; sets forth arguments for and against the legality of boycotting; shows what methods are used in labor disputes by workmen and employers, and describes the trade and labor boycott cases decided by the federal courts and higher state courts. It will be found an interesting addition to the builder's library.

Convention of Builders' Exchanges

Name of the Old Association Changed to National Association of Builders' Exchanges at the Louisville Meeting

A WHIRLWIND business session, an enthusiastic spirit of organization and a determination to wage a persistent campaign for the betterment of conditions of contracting in the United States marked the proceedings of the Third Annual Convention of the National Association of Builders' Exchanges, held in Louisville, Ky., January 20 to 22. The old name "National Building Trades and Employers' Association," adopted at the Washington meeting in February, 1912, was dropped and hereafter the organization will be known as The National Association of Builders' Exchanges, although its constitution provides for the affiliation of kindred interests. One hundred bona fida delegates and a large number of alternates were seated on the floor of the convention hall representing organizations from coast to coast.

Perhaps the most important action taken at the convention was the adoption and recommendation for temporary use of a new Uniform Contract drawn to represent equitable conditions between the architect, owner and contractor and from which is eliminated the many objectionable phases of the present Uniform Contract. The addresses made by prominent men at the convention were received with great enthusiasm, and before adjournment opinion was unanimous that present working conditions must be changed and a campaign inaugurated to bring out such reforms as are needed.

Panoramic Picture Taken in Front of the Seelbach Hotel, Louisville, Following a Prolonged Business
However, Appears Twice, He Being the Ninth From

Resolution to Standardize Specifications

The resolution embodying the sense of the national organization is here given in full so that it may be properly understood:

That Whereas: The proposition and resolution to standardize specifications and provide equitable contract conditions that were endorsed at the last convention and which have been compiled together with an analysis of the sixty-three articles of contract documents proposed by the American Institute of Architects and many other publications and suggestions of parties interested in building construction, on the question of said standardization and equitable contract conditions: which have been compiled by order of the Board of Control in book form, tentative to publication and sent to various building interests with a view of obtaining their opinion is now before this convention.

Therefore, Be It Resolved, In view of the fact that the endorsement of the principles set forth in this book have been unanimously approved without a dissenting voice at this convention assembled and that the same be hereby endorsed and approved.

There has in the last few hours been presented to our Board of Control a communication from Mr. Miles Day, chairman of the Committee on Contracts, of the American Institute of Architects, in which he states that their Board of Directors will meet within a few days with a view to acting upon this subject.

Be It Resolved Therefore, That inasmuch as this indicates the probability of agreeing upon standard and equitable conditions: that this book be referred to our contract committee with instructions to hold up its publication pending a meeting and if possible an agreement. If the meeting does not take place and no agreement is entered into, that this committee is hereby authorized and directed to make any changes in said book that they may deem necessary and then circulate it and other documents, with a view of giving publicity to the existing conditions in building construction and make an educational campaign against the present extremely hazardous and expensive conditions.

And in order to immediately stop the present loss in building construction and provide, without delay, equitable contract conditions,

Be It Further Resolved: That pending the reaching of an agreement with architects and architectural associations on fair and clear, standard and equitable contract documents: that the suggested form of contract in the pamphlet above referred to and approved, be urgently recommended for temporary use throughout the United States.

Having presented the most important action of the convention it is proper that the subject be handled from the beginning of the convention, which convened on Tuesday, January 20. Herbert J. West, president of the National Association, called the delegates to order in the big meeting hall of the Seelbach hotel, which was the official headquarters. Unexpected and urgent business prevented John H. Buschmeyer, mayor of Louisville, from delivering the address of welcome, but his secretary did well in his stead, offering the keys of the city to the visitors.

Address of Welcome

President A. J. Anderson of the Louisville Builders' Exchange briefly welcomed the delegates on behalf of Louisville and the Exchange, the response to these words of hospitality being made by President West. Among other things he said that "we are entering upon an era of equitable business relations, of regulated economic organization whereby the owner, the architect, the contractor and allied interests have realized that the time has come where fair dealing and ethical conditions must prevail. We now fully realize the value of concentrated effort and this potent force as applied to the building industry throughout the country, all flowing to the fountain head of the National Association, will accomplish results that cannot be measured by a monetary value, but we will surely note the gradual passing of unsafe methods and inequitable conditions as affect the building trades and their varied interests and will return to you a full measure of satisfaction in beholding a work that has been well done."

President West declared that the National Association does not aim to thrust itself into local conditions or Exchanges but strives to offer a common ground where all can sit and work out the conditions and problems of every day difficulties and merge the combined voice into a defined avenue of good. He said the officers of the National Association are giving their services voluntarily in the strictest sense of the word.

In closing, he commended the work of Secretary Scates and the other officers and said his earnest hope and firm belief is that the principles and ideals set forth by this body now strongly represented from such a wide area and that the great commercial interests and vast field of usefulness it covers may be served with a fidelity of purpose that will be lasting; that its relations with all interests may be concluded in perfect harmony and with a spirit that will promote their combined usefulness in the advancement of an art and science that had its inception in the birth of this universe.

Session—Only About One-half the Delegates in Attendance are Shown in the Picture—Col. Al Bourlier, the Left End and again at the Extreme Right End of the picture

Appointment of Committees

I. Herbert Scates of Baltimore, secretary of the National Association, thereupon announced the selection of assistant secretaries to handle the work of the convention in the persons of Charles A. Bowen, secretary of the Detroit Builders and Traders Exchange, and John A. Kelly, secretary of the Columbus Builders and Traders Exchange. Committees were appointed as follows:

Credentials—B. K. Nusbaum, of Philadelphia, chairman; Charles E. Welch, of Washington, and L. W. Hancock, of Louisville, Ky.

Resolutions—B. M. Freeman, of Columbus, Ohio, chairman; A. J. Anderson, of Louisville, Ky., and T. H. Evans, of Nashville, Tenn.

Nominations—Franklin M. Harris, Jr., of Philadelphia, chairman; George T. Stafford, of Birmingham, Ala., and George D. Nutt, of Detroit, Mich.

Constitution and By Laws—John Trainor, of Baltimore, Md., chairman; Henry Otis, of Detroit, Mich., and F. O. Schoedinger, of Columbus, Ohio.

Plans and Contracts (Left standing from last year)—Herbert J. West, J. Kemp Bartlett and Edward D. Preston, of Baltimore, Md.; H. L. Lewman, of Louisville, Ky.; Franklin M. Harris, Jr., of Philadelphia, and T. H. Norman, of New York.

Conference—H. L. Lewman, of Louisville, Ky., chairman; Charles Elmer Smith, of Washington, D. C., and J. D. Wood, of Atlanta, Ga.

Auditing—J. M. Vollmer, of Louisville, Ky., chairman; E. M. Tate, of Pittsburgh, Pa., and W. C. Schnute, of Evansville, Ind.

Tuesday Evening Entertainment

On Tuesday evening, the first day of the convention, an informal reception was held for the visitors for the purpose of getting acquainted and a light luncheon was served. An interesting and novel feature of the evening's entertainment was a lantern slide exhibition and lecture by S. S. King, representing The Builders' Exchange of Dayton, Ohio. The exhibition showed the scenes of the great flood last spring which inundated the entire down-town section of Dayton and destroyed millions of dollars worth of property. The marvelous rehabilitation and the present condition of the city, indicating the great energy necessary to restore the situation and make a Dayton even greater than before the flood, was a source of wonder and admiration to those who were present.

Wednesday Morning Session

The meeting Wednesday morning was called to order by President West, and Mr. Good, of Louisville, directed the attention of visitors to the various features of entertainment, including the trip to Mammoth Cave. The following resolution was then offered by Mr. Anderson, of Louisville, and carried unanimously.

"In view of the fact that a number of Builders' Exchanges in the United States are represented here by delegations and that said Exchanges are at the present time taking the necessary steps to become members of this organization, and, in fact, for all practical purposes are, at the present time, within the organization, and we needing their counsel and advice;

Be It Resolved, That all said representatives be given the power to vote and all privileges belonging to delegates and are hereby made full delegates to this convention.

The Secretary's Report

The annual report of Secretary I. H. Scates, indicating a very healthy and active state of finances, was read by the genial secretary himself. He dwelt upon the missionary work done by the officers in building up the National Association, and, in referring to architects' conferences, reported that an arrangement had finally been made to meet with the American Institute of Architects for the purpose of taking up disputed questions. He called attention to the need of State associations of Builders' Exchanges and urged that the State associations affiliate with the National organization and assume the responsibilities of the collection of the per capita tax for its maintenance.

In speaking of the opposition to the formation of the new National Association of Builders' Exchanges which has been carried on by certain interests Secretary Scates took occasion to bring out some rather startling facts.

Harry L. Lewman, of Louisville, Prest. National Association of Builders' Exchanges

"The greatest opposition to our movement," he said, "has not been that we are wrong in our plan or effort. There has come to us from all sections a recognition of the actual need of a National Association. Our greatest opposition has come from a quarter we had least right to expect. We see no reason to be discouraged by this, however, as an analysis of the communications in opposition to our movement shows, briefly, the suggestion that it has been tried before and the machinery and equipment of our organization being the same, no better, there is therefore no possibility of success; and having failed in the first, no support should be given to the efforts of this Association. That through an effective economical plan the national organization is endeavoring to establish sane, correct and equitable principles in the business relations between all who are in any way connected with the building trade. Opposition of this character has been of great benefit to our movement."

"I desire to impress upon this convention in its deliberations, the importance of careful consideration to the item of expense," continued Mr. Scates. "When three years ago in Philadelphia at the convention of the National Association of Builders' Exchanges a committee on reorganization was appointed that committee decided to organize the present Association upon a plan to avoid burdensome taxation for revenue and extravagant entertainment at conventions and which had, in their judgment caused the first national association to go 'on the rocks.' This committee believed that an excessive per capita tax would be a hardship upon local Exchanges; that they should profit by the mistakes of previous efforts, the most serious of which seemed to be over taxation, recognizing that when over taxation burdens a government or municipality they do not dissolve or become dormant, but on the contrary better systems are inaugurated, methods of reform and retrenchment take the place of extravagance and the burden being lessened the government continues under improved conditions."

The Item of Expense

"An active national association must have a distributed membership attracting attention and support to a compact governing body; its officers selected by and from its affiliated associations with active work by responsible committees within the limits of its constituted authority. In considering the item of expense I desire to present some figures of record of the first national association. A per capita tax of $3, with the exception of a few years: those years it being fixed at $2. Under such a tax the Baltimore Builders' Exchange would today be paying $975 per annum. I submit to you the following reports of the expenses of the old national association, covering the years 1888-1889, 92-94-95-96—a period of seven years.

Total amount received during that time was	$49,216.85
Total disbursements, same period was	48,312.45
Leaving a balance of	$ 940.40
Of this amount there was received by the secretary as salary	$23,541.77
Salary to assistant secretary	6,875.00
Traveling expenses of secretary	1,490.37
Office rent	1,914.56
A total of	$34,726.10

Nor did the tax upon Exchanges stop here. A custom prevailed for lavish entertainment at concentions, this burden falling upon local Exchanges. The expense of entertaining the local Builders' Exchanges in cities where conventions were held for six annual conventions totaled $51,256.44.

Closing with a statement that he shall urge to the last moment that expenses of the National Association be curtailed to the most economical plan possible and declaring that a resolution should be adopted forbidding local Exchanges from making elaborate plans for entertainment, Secretary Scates thanked the officers and members for their support and said he must retire as national secretary.

The General Commissioner

The report was accepted with thanks by the delegates and an engraved copy of the findings of the committee authorized to report to the convention on the report was ordered prepared for presentation to Mr. Scates. His work was highly commended in a resolution adopted later and an appreciation shown of his untiring efforts which were made without charge.

Mr. Scates was made General Commissioner of the organization at the close of the convention and will have charge of the various State Commissioners, thereby keeping in close touch with the work all over the country.

Reports of State Commissioners

The report of the State Commissioners was then taken up, the following commissioners reporting: C. A. Bowen, Detroit, for the State of Michigan, declared that a State Association of Exchanges had been formed in Michigan; J. D. Wood, Atlanta, Ga., reported for his state that it was not well organized from a Builders' Exchange standpoint; G. T. Stafford, Birmingham, Ala., reporting for his state declared that tentative organizations have been formed in Montgomery, Mobile and Selina; S. Frank Bennett, of Baltimore, for the State of Maryland, indicated a healthy state of organization; J. M. Vollmer, of Louisville, speaking of Kentucky, declared that efforts are being made to establish Exchanges in various cities of that State; Charles A. Langly, of Washington, D. C., reported for the District of Columbia, and A. I. Fowler for Pennsylvania.

A number of communications carrying the best wishes of the various Exchanges, kindred organizations and individuals were read and heartily received by the delegates. Adjournment was then taken until the afternoon.

Wednesday Afternoon Session

H. L. Lewman, vice president of the National Association, and a striking figure of the convention who was elected president at the close of the meeting, made the principal address of the convention Wednesday afternoon. Beginning with a statement that the last meeting endorsed a reform movement to accurately define and standardize, wherever practicable, plans and specifications in order to eliminate unnecessary risks, hazards and uncertainties in construction contracts; to reduce the cost of improvement to the owner; to give the contractors and surety companies a proper understanding of the obligations they assume; to establish contracting and suretyship on a more stable and definite basis; to provide for the settlement of differences by some equitable constituted authority and to establish building contracts on such a basis that banks and commercial institutions may intelligently determine the amount of credit to be extended to owners and contractors and to eliminate the present uncertain condition of credits based upon such contracts, Mr. Lewman launched into a subject that had the delegates cheering a number of times.

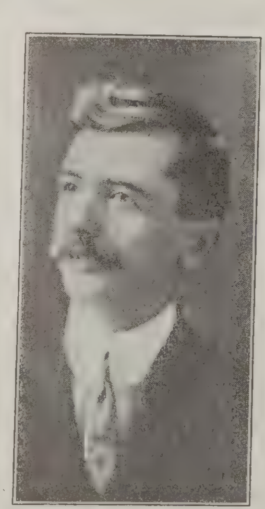
VICE-PREST.—JOHN TRAINOR, OF BALTIMORE

SECRETARY—J. M. VOLLMER, OF LOUISVILLE

Present System Harmful

"The present system employed in the preparation of contracts and specifications," he said, "is a relic of antiquity and is an outgrowth of the practice years ago when the builder was merely a mechanic. It brings about a subserviency upon the part of the contractors, which is highly detrimental to the interests of the building business, but more important still, it greatly restricts and stifles competition. The consequences of a system of such uncertain provisions are bound to be harmful both to the owner, the contractor and to the allied interests. Under this system, or rather lack of system, employed in construction, a specification lacking in definite description, filled at every crook and turn with arbitrary and incomprehensive clauses, is prepared and upon this the contractor is asked to make a bid. He is immediately faced with the proposition that his interests will be wholly dependent upon the manner in which the authority is exercised, and what ought to be a close, careful and accurate estimate based upon known facts, becomes a question of his estimate of the personal character and disposition of the supervising officer. In this age which has produced such effective business machines, working with marvelous precision, is it not to be regretted that we are still struggling along with such primitive methods, which are wholly inadequate for present day practice?"

Mr. Lewman called attention to the accurate and explicit designation of the various articles in trade and said that "through the entire field of commerce, except the construction business, we find this advancement in the clear, accurate and explicit description of the different articles traded in." Mr. Lewman further called attention to the action of the National Association of Credit Men in endorsing the movement to put contracting upon a more equitable basis through the adoption of resolutions providing for the regulation of the drastic and autocratic power of the architect. He also called attention to the address of Sullivan W. Jones, of the architectural firm of Palmer, Hornbostel & Jones, of New York, who declared that in the production of these important documents—the plans and specifications—the architect's present day methods are wholly obsolete and totally inadequate to the tremendous complex contracting operations, involving as they do large amounts of capital.



TREASURER — GEORGE C. SCHROEDER, OF GRAND RAPIDS, MICH.

GENERAL COMMISSIONER—I. HERBERT SCATES, OF BALTIMORE, MD.

National Association of Builders' Exchanges

Shall the Architect's Decision Be Final?

"As the lines are now drawn," declared Mr. Lewman, "it appears that the real issue in this controversy is whether the architect shall be the final interpreter and judge without appeal of the plans and specifications which he creates for the use of commercial interests, or whether the building and commercial interests, who based their bids upon what the plans and specifications actually show, shall have protection after the price is determined, by providing for an equitable and reasonable construction of what is shown on their face, and not force upon the builder conditions that permit the rendering of a decision contrary to the actual facts and deny right of appeal to arbitration of courts. In other words, the specifications should be construed on the basis of what they actually show and not be left open to uncertainties and opportunities for fraud by providing for future interpretation. Remember that the courts have held that there can be no appeal from the decision of an architect in a contract which makes the architect the final judge of materials and of the interpretation of plans and specifications. A significant fact is that over fifty per cent of the cases in court, involving the interpretation of construction contracts, the engineer or architect strenuously resists every effort to bring out the merit or equity of any question, but attempts to shield himself behind the arbitrary powers reserved by him in the specifications."

Following Mr. Lewman's address Mr. Miller, of Cincinnati, moved the adoption of his address as the sentiment of the convention and that copies be printed and circulated generally. A rising vote of thanks for the untiring efforts of Mr. Lewman was then taken.

Change of Name of Association

The matter of changes in the name of the association and changes in the constitution and by-laws were taken up. The name was changed to The National Association of Builders' Exchanges and the constitution amended to admit kindred interests. Other changes relative to minor points in the rules and regulations were adopted.

The Subscription Banquet

On Wednesday evening the delegates and their wives and families were given a subscription banquet in the Seelbach hotel which was largely attended and was a very happy affair. I. H. Scrates, of Baltimore, presided as toastmaster, his humor affecting the assembly so that of the dozen or more impromptu talks that were made, each was received with applause and laughter. The city of Columbus, Ohio, came in for many jocular remarks by the speakers at the banquet. Columbus was seeking the convention for 1915 (and landed it, by the way). Little tin bugs in the hands of those assembled kept constantly chirping for Columbus so that Mr. Scates finally admitted that Columbus must be the center of the universe and all other cities merely suburbs.

Thursday's Session

The principal address of Thursday was that of the Hon. Charles Carroll, of Louisville, Ky., who in the course of his remarks said: "Upon careful consideration of the question I am thoroughly convinced that in some respects, at least, men may have a thorough knowledge of the practical part of their business and yet be lacking in knowledge, or at least careless in considering their interest when it comes to preparing contracts upon which the success of their business depends. In this land of the law where all matters affecting the construction and integrity of contracts are determined by men whose lives are devoted to that subject, who have given years of faithful study and investigation in order that they may be fitted to discharge the duties of passing upon such matters, who have taken an oath to faithfully and impartially decide the questions of law arising and who often have the aid of intelligent juries to pass upon the questions of fact in controversy; when such a system has been tried for centuries and had proved the most satisfactory way of settling differences and of arriving at the right and justice of controverted points, it is surprising that in a business of such magnitude as yours, involving millions of dollars, involving the financial credit of the contractor and his reputation as a builder, that so many of you will enter into contracts by which you waive your right to a settlement of controverted points in the manner provided by law and which has the approval of centuries of practical experience and let your fortunes and your reputations be determined by one whose interest may be antagonistic to yours and who, however honest he may be, by reason of temperament or prejudice or lack of knowledge may so rule as to do you incalculable injury."

"Now, it has been decided time and again that a contract so entered into is binding and the judgment of the arbiter so elected is conclusive unless it can be shown that his opinion was based upon a mistake, or negligence so gross as to justify the inference of bad faith and the burden of proving this bad faith is upon the one making the charge."

Form of Contract Criticised

"There has been submitted to my observation a proposed form of contract composed of sixty-three articles and promulgated by the American Institute of Architects which the National Association of Builders' Exchanges is asked to adopt as a form of contract to be in force in the various parts of this country. This contract is so unjust in many particulars that I feel it necessary to call the attention of the association to it.

"Article 12 of the contract provides that the contractor, upon receiving written notice from the architect, shall within the time of the notice specified remove from the premises all material, whether worked or unworked, and take down and remove all portions or work condemned by the architect as unsound or improper in any way failing to conform to the contract, and the contractor shall replace the work in accordance with the contract, and all at his own expense. This article places the entire determination of the question as to whether the work is properly or improperly done in the hands of the architect.

"Again in Article 39 it is provided that in all cases except those in which an appeal to arbitration is permitted the final decision in all questions arising under contract shall be given by the architect, and the owner and the contractor shall be bound thereby. And in Article 40 it is provided that the architect is to be the interpreter of the contract and define its true intent and meaning.

"Under the provisions of this contract only in a few minor cases can arbitration be resorted to. Upon all material questions the judgment of the architect is final. A contractor may proceed almost to the final completion of the building and the architect may discover a fault in that construction, which fault exists only in his imagination, yet he can compel the contractor to tear down the building at his own expense and rebuild at his own expense when in every particular the original construction may have been in accordance with the contract, and unless it can be shown that the architect acted in bad faith or with such gross negligence as to imply fraud, the contractor is helpless.

Again, if the contractor signs the contract, the meaning of which to him is plain, yet if any question arises as to the meaning of the contract the architect determines what it means, places such construction upon it as he wishes and the contractor is without remedy. It is not surprising that the making of such improvident contracts frequently results in the bankruptcy of the contractor. The character of the contract is also injurious to the owner in this, that the contractor who signs such a contract must take into consideration and does take into consideration the uncertainty of the construction that may be placed upon the contract by the architect.

"It must be borne in mind that the architect is employed by the owner of the building and paid by him and the contractor has no voice in these proceedings. It is therefore perfectly natural that his feelings will be altogether with the owner, and we have under this proposed contract the anomolous condition of a judge to determine any question in controversy between the parties, selected and paid by one of the parties. Under the law of all civilized countries it is expressly provided that no man shall sit in trial upon his own case and no man shall act as judge who is interested, financially or otherwise, in the result of the litigation, and it is only in construction contracts that it is sought to make the arbiter of controverted questions a man whose interests and feelings are necessarily biased."

Appointment of State Commissioners

The following State Commissioners were appointed to serve for the ensuing year:

Alabama—W. T. Estes, of Birmingham.
California—C. A. Day, of San Francisco.
Florida—J. H. Kooker, of Jacksonville.
Georgia—J. D. Wood, of Atlanta.
Indiana—C. C. Pierson, of Indianapolis.
Kentucky—A. J. Anderson, of Louisville.
Maryland—S. T. Bennett, of Baltimore.
Michigan—C. A. Bowen, of Detroit.
Missouri—F. G. Boyd, of St Louis.
Nebraska—Grant Parsons, of Omaha.
North Carolina—H. A. Phfal, of Winston-Salem.
Ohio—John A. Kelley, of Columbus.
Pennsylvania—F. M. Harris, Jr., of Philadelphia.
Tennessee—T. H. Evans, of Nashville.
Washington, D. C.—E. R. S. Emory, of Washington.

The Quantity System in Estimating

Some very interesting remarks were made by G. Alexander Wright, of San Francisco, Calif., who briefly referred to his 13,000 mile trip over the country advocating the Quantity System in Estimating. The convention by resolution thanked Mr. Wright for helping to arouse the contractors to a realization of the present inequitable conditions.

Mr. Miller, of Chicago, representing the Chicago Architects Business Association, made a few remarks and offered the work of his association to the convention, declaring that many of the reforms advocated by the Association are being carried out in the city of Chicago.

The Conference of the Secretaries which preceded the convention and a report of which will be found elsewhere in this issue was heartily endorsed.

Officers for 1914

The following officials were elected to serve for the ensuing year:

President, H. L. Lewman, of Louisville, Ky.
Vice-President, John Trainor, of Baltimore, Md.
Secretary, J. M. Vollmer, of Louisville, Ky.
Treasurer, Geo. C. Schroeder, of Grand Rapids, Mich.
General Commissioner, I. H. Scates, of Baltimore, Md.

Resolutions of thanks were offered the city of Louisville for the manner in which it had entertained the visiting delegates, and thanks were also extended to Chas. A. Bowen, of Detroit, and John A. Kelley, of Columbus, for their work as assistant secretaries during the convention.

◆

Building in Providence in 1913

Building operations in the city of Providence, R. I., in 1913 showed an increase in the number of permits issued as compared with the year before, although the value of the estimated improvements were somewhat less than in 1912. According to Inspector of Buildings Spencer B. Hopkins, there were issued last year by his department 3184 permits for building construction estimated to cost $7,289,100. In 1912 his department issued 2767 permits, which called for an estimated outlay of $8,530,800.

This increase in 1912 over 1913 in the amount of vested capital involved was due largely to the permit granted for the 16-story office building erected at the junction of Westminster and Weybosset streets, and known as "Turk's Head," the new building taking its name from the site upon which it was erected.

◆

Architectural Appearance of Warehouses

The architectural appearance of a warehouse is something which often receives scant attention and sometimes presents real difficulties. Numerous examples might be given of buildings of this class where the æsthetic features have not been entirely neglected. Notable among these is a warehouse in Lowell, Mass., designed by Lockwood, Greene & Co. which has the appearance of the best class of office building. This result was obtained by brick paneling, the grooving of the surface of the concrete on the first three floors and a heavy concrete cornice.

The jury that was selected to consider the plans for the new court house and city hall building to be erected in Pittsburgh at a cost of $3,000,000 has announced that Architect Edward B. Lee of Palmer, Hornbostel & Jones, New York City, has been awarded the prize. The work of construction will be under the supervision of the firm named. Mr. Lee only recently returned from San Francisco where he supervised the construction of the Pennsylvania Building on the grounds of the Panama-Pacific International Exposition.

Method of Laying a Concrete Floor

Proportions of Mixture When Used for Different Kinds of Floors—The Finishing Coat—Slope of Floor

TOO much care cannot be exercised in preparing the foundation for a concrete floor. This should always be well drained, and firmed to a depth of from 6 to 8 in. below the concrete. It pays to tamp this foundation thoroughly before putting on the mixture. If the soil contains a great deal of clay, it may be necessary to remove part of it and to fill in with broken stone, gravel or cinders to within 4 or 6 in. of the proposed finished surface, depending upon the thickness of the floor. Blind drains of coarse gravel or tile may be laid from the lowest points in the excavation to carry off any water that may accumulate beneath the structure.

For the construction of the ordinary stable or barn floor, which is not to carry any great weight, the following proportion is to be recommended for the concrete base, says H. M. Bainer, of the Colorado Agricultural College: One part cement, 2½ parts clean, sharp sand, and 5 parts loose gravel or broken stone. This should be finished on the surface with a 1 to 1½-in. layer of a mixture of 1 part cement and 1½ to 2 parts of clean, sharp sand. The total thickness of this floor must be from 5 to 8 in., depending upon the load it is to carry.

For engine foundations, floors, or driveways over which heavy loads pass, the following proportion is to be recommended: One part cement, 2 parts sand, and 4 parts broken stone or gravel.

Constructing Large Floors

For all large floors, it is advisable to place the concrete in sections not to exceed 6 ft. square. This may be done by placing a 2-in. plank of a width equal to the desired thickness of the floor on edge, as a box in which the concrete is tamped until water begins to show on top. Make several of these forms, holding the plank in place by means of stakes driven into the surface. These stakes should be driven on the outside of the form so that they can be easily removed after the concrete has partly set and the planks have been taken out. Fill alternate forms at first, tamping the concrete thoroughly, especially the edges. As soon as the concrete has partly set, remove the plank and fill in the forms not filled at first. Mark the side plank to show exactly where the joints come.

The finishing coat should be spread on before the concrete has set. To make this of uniform thickness it is best to place either 1-in. or ½-in. wood strips, as is desired, on top of the concrete, over which a straight edge may be run. Smooth with a trowel for a smooth surface, or with a wooden float for a rough surface. Groove exactly over the joints of the concrete so as to level the edges of each block. Do not trowel the surface too much, as it tends to separate the cement from the sand and injure the wearing surface.

The floor should be constructed with slope enough to carry all liquids to certain points from which they may be drained. Protect the new floor from the direct rays of the sun, currents of air, and frost; and keep constantly moistened for several days. Water is very important in the curing of concrete construction, and must be liberally used.

Use nothing but the best cement that can be obtained. The sand should be clean, sharp and not too fine; it should be freed from loam or clay, as these will tend to destroy the adhesive quality and retard the setting of the concrete. Use only pure water for mixing. Mix thoroughly. Water thoroughly. Cure thoroughly.

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Wilkes Barre's New Building Code

The city council of Wilkes Barre, Pa., has just adopted a new Building Code which was compiled by a committee of local architects and builders and which has been pronounced the most modern of its kind in the eastern section of the country.

The hights of buildings are regulated to range from not more than 16 stories or 200 ft. in the first class to under 40 ft. in the seventh class. The hight of no building, however, shall exceed four times the width of the street upon which the structure facts and no building shall be over 200 ft. in hight. The hights are also governed by the widths of structures.

The code controls the seating capacity of a theatre; the ventilation of similar public buildings and safety from fire. Heretofore when a person erected a building or other structure it was necessary to do business with more than one city department. Under the new code, all business will be done with the department of buildings.

There are seven classes of buildings as follows:

First—Built entirely of incombustible fire and waterproof material.

Second—Similar in construction to first class except that the finished floors, frames, doors, windows and the usual trim of rooms are of ordinary wood with no open spaces behind the wood.

Third—Wall or metal frames similar to those of second class, but the floor fireproofing is made in long flat spans and panels of reinforced, or armored, concrete, with partitions built wholly of incombustible material.

Fourth—When enclosing walls and roof covering are made of incombustible materials with doors, windows, etc., of wood, but with interior walls of brick of steel and fireproof beams and ceilings.

Fifth—When enclosing walls and roof are of incombustible material with interior walls of brick with floor and roof systems of heavy timbers with no concealed air spaces between.

Sixth—When enclosing walls and roof are similar to those in fourth and fifth class, but with interior timber and iron parts not protected with fire-resisting covering.

Seventh—When enclosing and interior partitions are constructed entirely of wood.

Meeting of Secretaries of Exchanges

Representatives of 35 Builders' Exchanges in Attendance—Important Matters Considered—Scope of a Secretary's Work

A CONFERENCE of secretaries of the Builders' Exchanges allied with the National Association of Builders' Exchanges was held on the day previous to the convention at Louisville and was productive of such great good that the convention itself endorsed these affairs and strongly recommended their continuance. Every subject pertaining to the welfare of the organizations of builders was taken up in this conference and dealt with *sans* gloves. Troubles and experiences were exchanged and every man had a chance to be heard.

READING FROM LEFT TO RIGHT ARE SECRETARIES KELLEY OF COLUMBUS, PHILLIPS OF YOUNGSTOWN, PHELPS OF DAYTON, WOOD OF ATLANTA, VOLLMER OF LOUISVILLE, BOYD OF ST. LOUIS, BOWEN OF DETROIT, RUEN OF QUINCY AND ALBRECHT OF TOLEDO

Meeting of Secretaries of the Builders' Exchanges—The Advance Guard

J. M. Vollmer, secretary of the Louisville Builders' Exchange, presided at the meeting which was attended by 35 secretaries from all parts of the country. Charles A. Bowen, the secretary of the Detroit Builders' & Traders' Exchange, who was the originator of the idea of having the secretaries meet in conference, the first of which was held in Detroit in September, 1912, addressed the meeting explaining the advantages of the conferences and declaring that they are great factors in the betterment of the work of builders' organizations.

In discussing the question of the best way of securing new members it was brought out that the Exchange must first be developed to the highest efficiency and mean something to the trade and then it is not necessary to solicit members. The builders recognize the benefits and clamor to join.

The subject of the scope of the secretary's work came in for a round of discussion. Many of the secretaries have several assistants and departments to look after while others are alone and must run errands, look after everything from filling the water bottle in the morning to helping serve at a luncheon. That the secretary is a much overworked individual, also a much abused one, was unquestioned, naturally.

Publicity was one of the big questions at the conference. The secretaries realize its value and many of them are using the daily papers, the Sunday editions, the trade magazines and other public influences to put the Exchange in a good light before the people and to increase its efficiency.

That sub contractors' organizations within the major body are of great benefit was brought out in many ways. The secretaries declared that these organizations should be fostered and encouraged as they are in many cases the backbone of the Exchange itself. They also lead to many new members for the major organization.

The matter of securing skilled mechanics and competent workmen was taken up at length. The absolute necessity of the trade or continuation school was dwelt upon by a number of the secretaries and in many cities the Exchanges are urging the Boards of Education to establish schools. Some of the cities already have such institutions, built at private or public expense and although some difficulties are had with the labor unions it is found that these schools are turning out intelligent workmen for the betterment of the industry.

Workmen's compensation laws, which have either been passed or are in the hands of the legislators of the various States were discussed at length. The Ohio compulsory law was regarded as a fairly satisfactory scheme but the rates are very high at present. A compulsory law was regarded as more satisfactory than an optional law because it puts all the builders upon the same basis and each must figure it into his overhead expense.

The desirability of lien laws of uniformity was discussed, the Ohio law coming in for criticism by reason of the amount of red tape involved. A bond that a contractor shall pay for all material and labor was regarded as the best system.

State organizations and benefits accruing therefrom, relationship of contractors and bonding companies, necessity of co-operation between architect and contractor, need of ethical business practices for contracting business, social features for bringing about good feeling among members and other features were brought out, according to program, and much interesting information was gathered.

The attachment of a dining room to Exchanges, similar to that operated by the Columbus Builders' & Traders' Exchange, solves the problem of getting the men together at the 'Change hour. Some 75 to 100 members of the Columbus Exchange take lunch daily at headquarters. The directors meet once a week and have luncheon and discuss the business of the organization.

The following were some of those present, with addresses to which correspondence will promptly reach them:

Some of the Secretaries in Attendance

J. M. Vollmer, 400 Realty Building, Louisville, Ky.
J. D. Wood, 1530 Candler Building, Atlanta, Ga.
W. J. Albrecht, care Builders' Exchange, Toledo, O.
W. A. Phelps, care Builders' Exchange, Dayton, O.
J. A. Kelley, care Builders' Exchange, Columbus, O.
Chas. Elmer Smith, 18 South Seventh street, Philadelphia, Pa.
C. E. Welsh, 1220 New York avenue, N. W., Washington, D. C.
J. A. G. Badorf, care Builders' Exchange, Kansas City, Mo.
A. H. Shank, care Builders' Exchange, Grand Rapids, Mich.
A. M. Roehl, 1606 Spring street, Quincy, Ill.
J. Gordon Phillips, 620 Dollar Bank Building, Youngstown, O.
Chas. A. Bowen, Penobscot Building, Detroit, Mich.
W. J. Schnute, care Schnute, Holtmann Co., Evansville, Ind.
G. E. Oldham, Board of Commerce Building, Knoxville, Tenn.
E. M. Tate, 207 Fulton Building, Pittsburgh, Pa.
I. H. Scates, 15 East Fayette street, Baltimore, Md.
G. T. Stafford, Chamber of Commerce Building, Birmingham, Ala.
L. M. Moore, care Hendricks, Moore Young Co., Lexington, Ky.
T. H. Evans, third floor, Noel Block, Nashville, Tenn.
Donald Kirkpatrick, care Builders' Exchange, Springfield, O.

The banquet at the Watterson hotel given for the secretaries was one of the elegant affairs of the week. There were 14 courses and several kinds of wines. Secretary Vollmer declared that it was merely his way of indicating that there was nothing too good for the secretaries.

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The Licensing of Builders

The classifications to be used by the Board of Examiners in the Building Department of Boston, Mass., in respect to the granting of licenses to builders are as follows:

"(a) Charge or control of the construction of first-class buildings; (b) Charge or control of the construction or alteration of second-class buildings; (c) Charge or control of the construction or alteration of third-class buildings; (d) Charge or control of the moving or shoring of buildings or structures; (e) Charge or control of the tearing down of buildings or structures."

According to Building Commissioner Everett the man licensed under Class (a) may take charge of work under Class (b) and (c), and one licensed under (b) may have charge of work under Class (c). In his judgment in many cases a man with a Class (a) license might have charge of the work of Classes (d) and (e).

He further expressed an opinion "that the usual practice would be to appoint one man who should be in control from the beginning to the end of any complete piece of work. If for the convenience of the owner or builder it is desirable to divide the work say by making the foundations, the steel frame and the remainder of the work each a part by itself, he may place a qualified and licensed man in charge of the foundations, another in charge of the erection of the steel frame, and still another in charge of the remainder of the work." In the opinion of the Commissioner the person in charge may in his discretion leave the work when he judges it safe to do so, and he holds that subcontractors do not require a licensed man in charge. If the general contractor has such, he says, he does not understand that each sub-division of the work shall be in charge of a licensed person, but that it will be the duty of the person in charge of the whole work to see that the several parts are performed in a safe and proper manner.

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Cleveland Sheet Metal Contractors Association

At the annual meeting and banquet of the Sheet Metal Contractors Association of Cleveland, Ohio, the following officers were elected:

President	Frank B. Hiller
Vice-Pres	H. S. Bennett
Secretary	Chester M. Harris
Treasurer	F. M. Potter

The meeting was one of the most enjoyable ever held by the Association, and in his opening address former President H. G. McGrath appealed to sheet metal contractors to work together on the price question so that they may be able to secure fair prices for their work. He also spoke of the scarcity of mechanics and urged members to do what they could to induce boys to enter the technical high school to learn the sheet metal and other trades.

President G. A. Rutherford of the Cleveland Builders Exchange gave an interesting talk on organization in business, pointing out that the heads of concerns often devote too much time to details which they should leave to others so that they might devote their own time to big things. He also suggested that business concerns should develop a feeling of good will among the trade which could be secured by always giving good measure when doing work.

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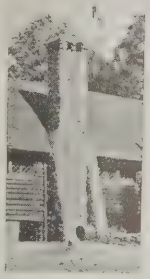
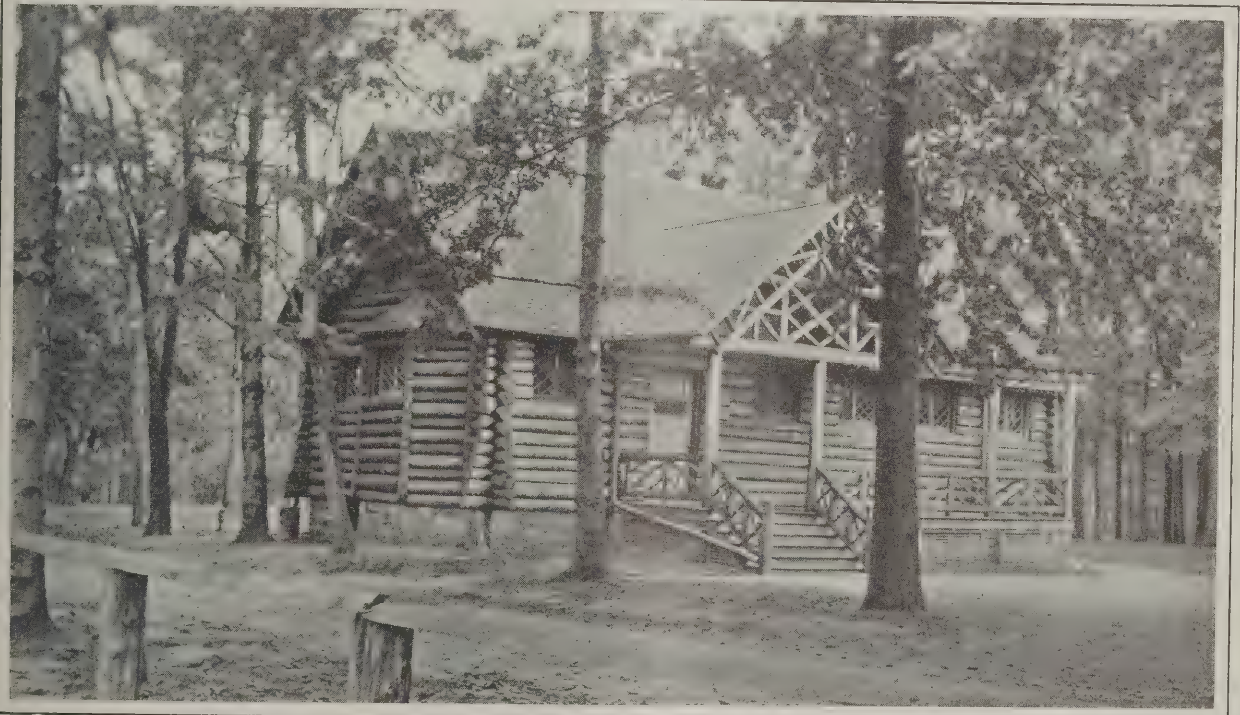
Wallis & Goodwillie announce the removal of their architectural offices from 346 Fourth avenue to 56 West 45th street, New York City, the change having occurred on January 15.

Rustic Athletic Lodge for City Park

Description of Locker and Shower Bath House at Pelham Bay Park, on Long Island Sound

THE log cabin as a permanent residence has been out of fashion for some years in the United States, and even as a material for the construction of a summer house the price of logs is such in most localities that the private house owner generally decides in favor of other material. The fact remains, however, that for picturesque effects there are few materials that will blend into a leafy setting in the same striking manner in which the log cabin nestles into its surroundings, and wherever the forest is the background and funds are available, the log structure is generally chosen. Despite the march of civilization, there are still patches of forest even in the populous sections of the country, and, strange to say, New York City is one of these places.



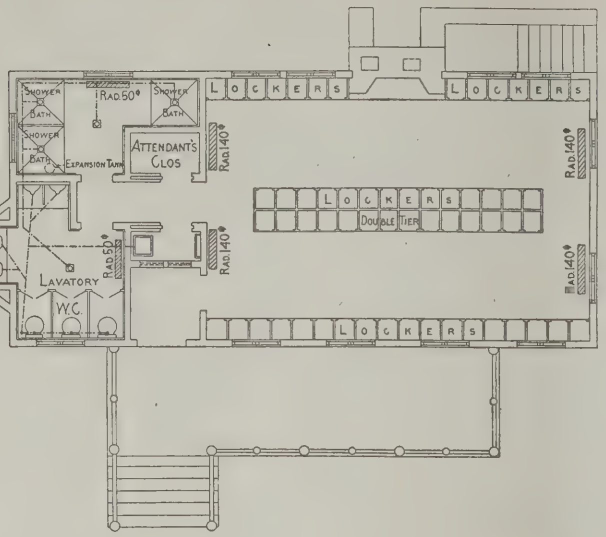


A Rustic Athletic Lodge for a City Park—Designed by A. G. Waldreaon, Architect for the Department of Parks in New York City

By a wise provision large tracts of timber within the corporate limits of Greater New York have been preserved for park purposes, Central Park, located in the center of Manhattan Island; Bronx Park, a few miles north, and Pelham Bay Park being three of these tracts. The last named is one of the largest park reservations in the city, and is located in the northeastern part of the Borough of the Bronx, bordering Long Island Sound. Here bathing is popular and provision has been made for other athletic sports, such as cricket, football and baseball in season. These activities necessitated an equipment of shower baths and locker space, and the fact that the athletic field was surrounded by an abundant growth of timber suggested the location of a rustic log cabin at the border of the forest, and the athletic lodge here shown was the result.

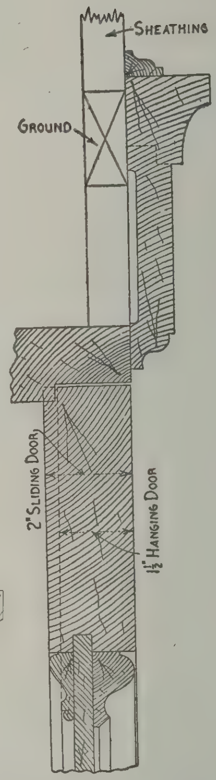
The over-all dimensions of the building are 49 x 23 ft., with a porch 32 x 9 ft. The large mainroom is 32 ft. 3 in. in length and provides locker space of 60 compartments, 18 on the front wall, a double tier of 28 in the center and 7 on either side of the fireplace on the back wall. A passageway at the middle of the inner end wall of the locker room gives access to the lavatories and shower baths. On the left of this passage is a small room containing an iron box sink for cleaning purposes. On the right is the attendants' closet, and beyond this is the entrance to the shower bath room and lavatories.

All of the Portland cement mortar used in the building is composed of one part cement to three parts sand. All brick and mason work was laid in Portland cement mortar. Foundation walls, piers and chimney are of field stones laid in a natural bed. The spaces between these stones were filled to the top with cement mortar and, wherever the interstices were large, spalls were driven into the mortar.

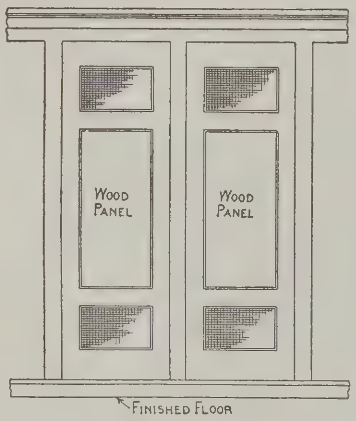


Floor Plan of Athletic Lodge Showing the Arrangement of the Many Lockers, the Various Shower Baths, the Lavatory and Water Closets, also the Radiation Provided for Heating Purposes.

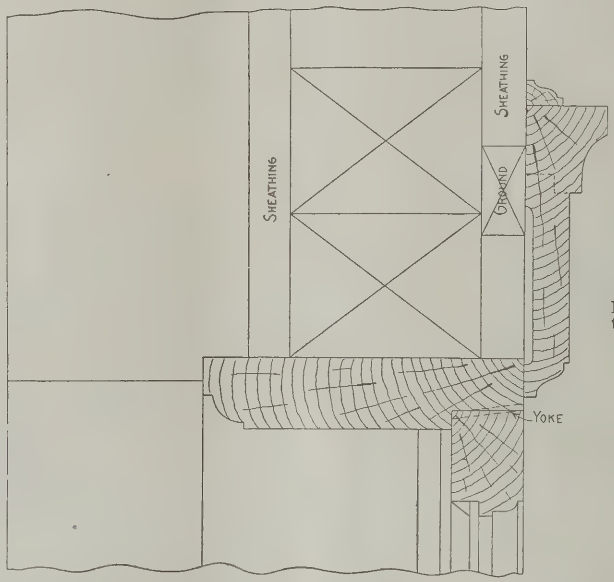
Scale 1/16 in. to the Foot.



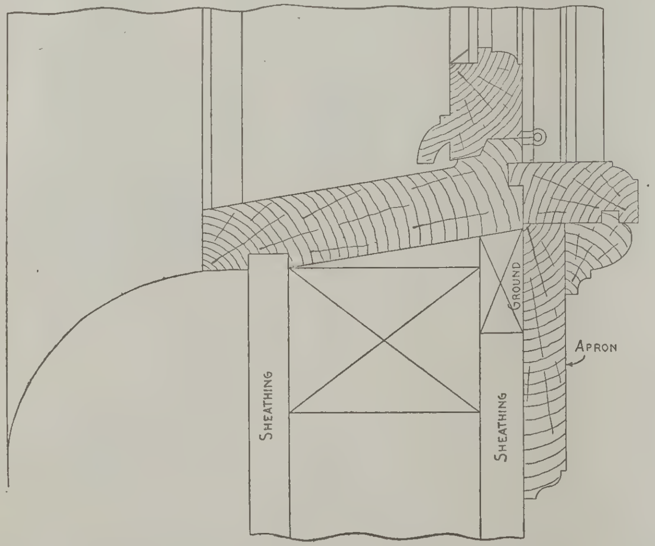
Detail of Architrave—Scale 3 in. to the Foot



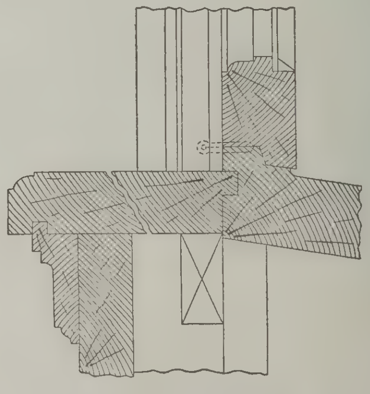
Two of the Side Lockers—Scale ¾ In. to the Foot



Vertical Section Through Jamb—Scale 3 In. to the Foot



Vertical Section Through Window Sill—Scale 3 In. to the Foot



Details of Window Stool and Cornice Mold to Lockers—Scale 3 In. to the Foot

A Rustic Athletic Lodge for a City Park—Plan and Miscellaneous Constructive Details

Large bond stones were used, extending through the full thickness of the wall, and occur at least once in every 6 superficial feet of the wall. All of the walls for cellar, cellar steps, piers and chimneys are underlaid with concrete base courses, the concrete composed of one part Portland cement, three parts sand and four parts 1½-in. broken stone. The entire cellar floor and space at the foot of the cellar entrance steps is laid with concrete, the underlying base being 5 in. in thickness and composed of one part Portland cement, three parts sand and five parts 1½-in. broken stone. The top or finishing coat is 1 in. in thickness and composed of two parts sand and one part Portland cement, troweled to a smooth surface. The floors of the shower bath room and lavatories are also of concrete.

The furnace and chimney flues are lined throughout with terra cotta flue lining. The shelf or mantel of the fireplace is of blue stone, 5 in. in thickness, as are also the sills for the cellar windows and the door.

The framing timbers are of the following dimensions: Plates, 4 x 6-in. spruce; sills, 4 x 6-in. spruce; braces, 3 x 4-in. spruce; studs, 3 x 4-in. spruce, 16 in. on centers; beams, 3 x 10-in. white pine; ceiling ties, 2 x 6-in. spruce, at every pair of rafters.

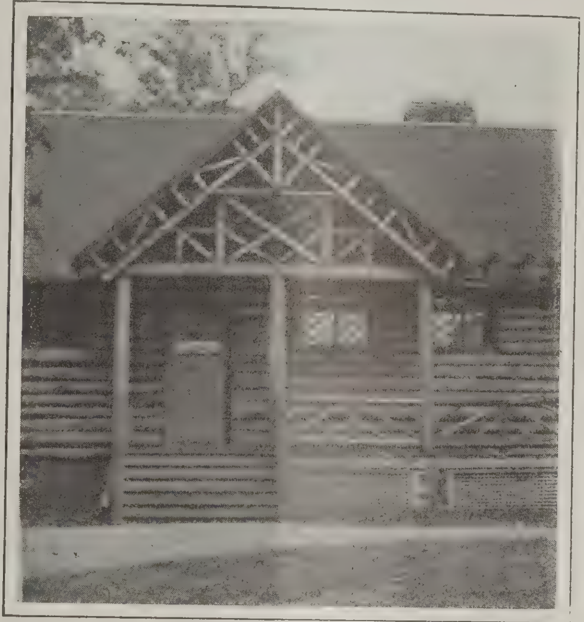
The posts are framed directly into sills and plates. Floor beams are notched into the sills. All headers and trimmers are double and are bolted together with ¾-in. bolts, spaced 12 in. on centers.

Outside sheathing is of 6 x ⅞-in. spruce, tongued and grooved, laid diagonally and covered with building paper. The roof is covered with first quality cedar shingles laid 4 in. to the weather, double butted every third course, and doubled at corners, the entire frame of the building is covered with white pine logs stripped of bark and varying from 8 to 10 in. in diameter. Full lengths are used where practicable, and the ends are cut square at window and door openings and at corners of buildings. The joints are pointed with Slater's cement. Mortise and tenon joints are used in the framing of all exterior and interior rustic work, including that of the ends of the building, gable end of porch, piazza, trusses and porch railings.

The interior walls and ceilings of the locker room, lavatory, vestibule, closets and the shower bath room above the slate wainscoting are sheathed with beaded, tongued and grooved North Carolina pine, comb grained stock, ⅞ x 3 in. in dimensions.

The water closet partitions are of ⅞ x 3-in. North Carolina pine, tongued and grooved, and set in a grooved rail supported on brass angles screwed against the sheathing and standards. The water closet doors are 1⅛ in. in thickness, and are provided with spring hinges of brass and with brass bolts. The windows of the main floor are designed with diamond-shaped lights, and are made in two sections, hung on brass butts and provided with top and bottom bolts. Each sash is provided with a brass spring catch with eyelet. The main vestibule door is planked with rough spruce, 1½ x 6 in. on the outside. The inside face is of North Carolina pine, paneled and molded. This door is hung on heavy wrought-iron hinges. All knobs and escutcheon plates are of imitation wrought iron. The rough flooring of the main story and attic is of 7-in. spruce, laid diagonally. The finished floors are of long-leaf Georgia pine, comb-grained, tongued and grooved, and ⅞ x 3 in. in dimensions.

The lockers are of Georgia pine and are provided with top and bottom vent panels, made of heavy wire mesh, and are each provided with four coat and hat hooks and a shelf.


A Rustic Athletic Lodge for a City Park — The Front Portal with Its Gable Cleverly Treated in Open-Work Design

The exterior sashes, window and door frames, lattice and floor of the piazza are primed with one coat of Atlantic lead and linseed oil and finished with two coats of Atlantic lead and oil. Shingles and exterior woodwork, with the above exceptions, are unfinished. All interior woodwork is filled with paste filler, finished with several coats of hard varnish, and rubbed down to a dull polish with pumice stone and water.

The plumbing equipment consists of three water closets, two urinals, two lavatories and three shower baths. Heat is furnished by a hot-water plant designed to supply 1000 sq. ft. of radiating area, and with radiators as shown on the plan reproduced herewith.

This athletic lodge was designed by A. G. Waldrean, architect for the Department of Parks of New York City, and erected under his supervision at Pelham Bay Park, in the Borough of the Bronx, Greater New York.

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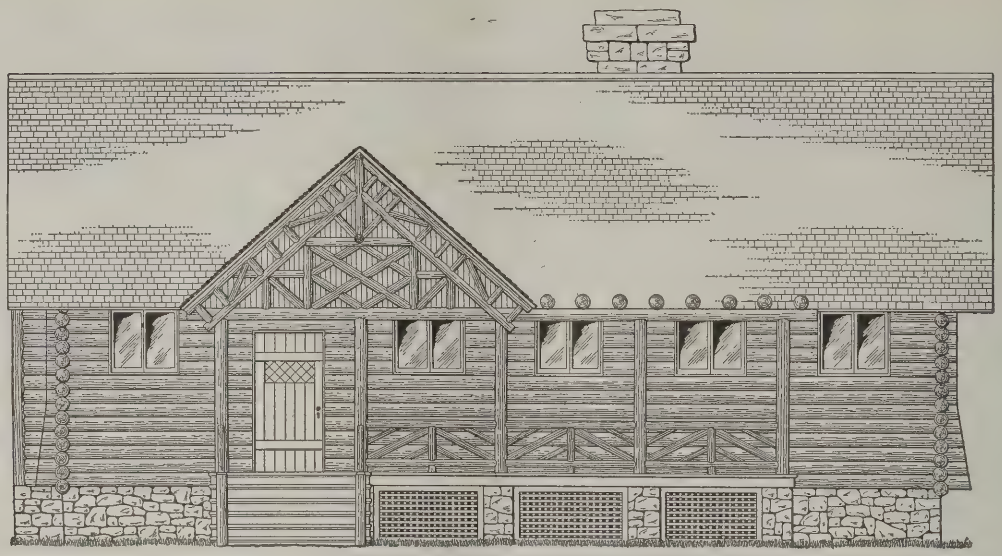
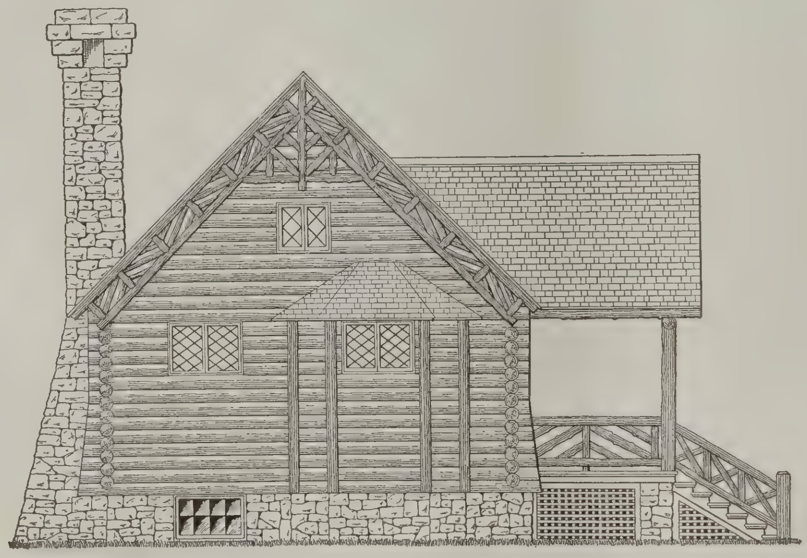
Rapid Foundation Work

A most interesting example of the use of hollow steel piles for rapid deep foundation work is found in connection with an operation lately conducted in West 28th street, New York City. Rock was located 38 ft. below the curb and the material above it was clay and water-bearing sand. The structural steel was due in three weeks but the completion of the cellar being still ten days away the steel pile foundation method appeared to offer the only solution of the problem. Specifications were drawn which called for 85 12-in. steel piles driven to rock, blown clean by compressed air and filled with concrete reinforced with 2-in. rods.

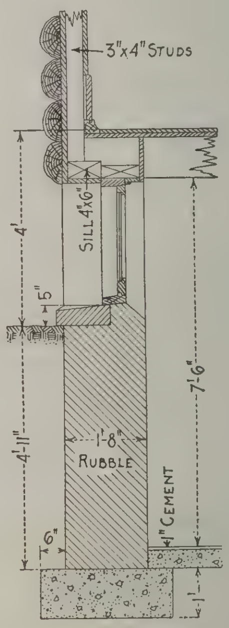
Notwithstanding various obstructions on the ground, the shoring of adjoining buildings, etc., the driving was started on the last day of the month. The excavator was still taking out his runway while the rear half of the lot was completely driven. Af-



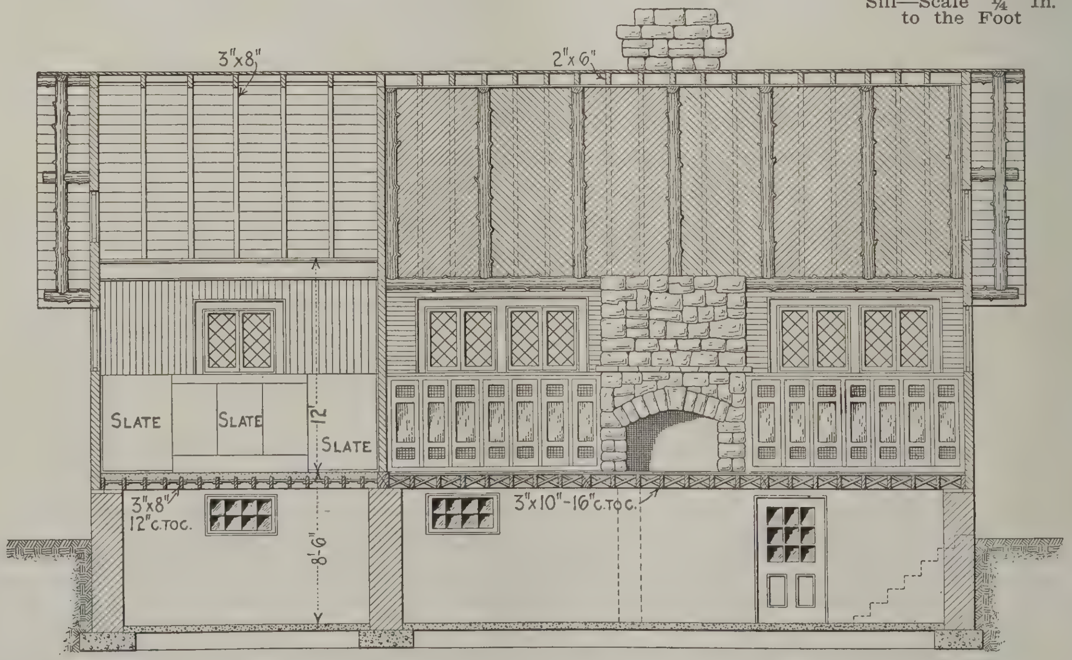
Front Elevation—Scale 3/32 In. to the Foot



Side Elevation—Scale 3/32 In. to the Foot



Section Through Foundation and Sill—Scale ¼ In. to the Foot

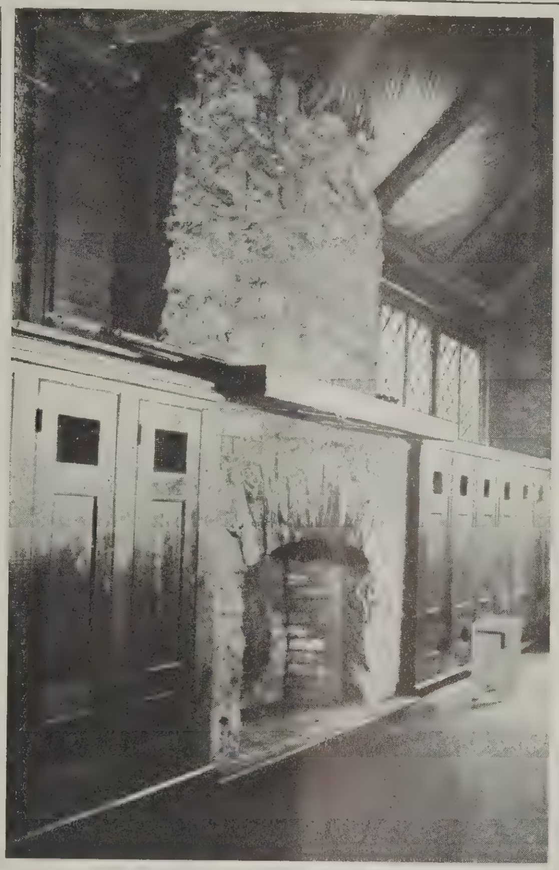


Longitudinal Section Through the Building—Scale 3/32 In. to the Foot

A Rustic Athletic Lodge for a City Park—Various Elevations and Sections ter he had left the ground a compressor was set up and the first pipe was blown on the 7th of the following month. Three days later all driving and cleaning had been completed and during the following two days all the piles were filled and capped, so that the entire foundation was completed several days before the expected arrival of the steel.

In another instance, where the contract called for the work to be completed in three months, the actual time required was exactly a month and a half, during which time all the excavation had been done, including sheeting, shoring, pile driving, mounting of concrete girders to carry the wall and capping of the piles ready to receive the grillage.

In this connection it may not be without interest to mention that the hollow steel piles are employed in clusters to support a building and are driven in the usual method. The steel pile sections vary in length from 20 ft. to 22 ft. and in diameter from 12 in. to 24 in. If the ground is to be penetrated to a depth greater than 22 ft. the sections of piling are connected by means of a sleeve in such a manner that a water-tight joint is formed. A jet of compressed air under a pressure of 150 lb. to the square inch is then employed to blow out the earth and water contained in the shell. When this has been done the exposed rock can be examined by lowering an electric light.



View in the Locker Room Showing the Rustic Chimney with its Open Fireplace and Projecting Shelf

After the piles in each pier have been cleaned out they are cut off at exactly the same height, a task that is exceedingly difficult when there is little room to operate. For the cutting process the oxy-acetylene torch was used. The hollow shell was next filled with concrete reinforced by 2-in. steel rods 50 ft. in length.

An idea of the carrying capacity of one of these piles may be gathered from the statement that on a single 12-in. steel pile 100 tons can be safely maintained. Piers containing 16 piles have been used and holding up to 1300 tons are not unusual.

Rapidity of building construction is of such great importance that the method of first making an open excavation to rock bottom in providing a foundation has been displaced very much by the system here described.

Rear View of the Building with Its Rustic Outside Chimney Forming a Sharp Contrast to the Foliage of the Surroundings

A Rustic Athletic Lodge for a City Park

Country Residence of Stone and Stucco

A Clever Blending of Various Materials for the Superstructure Combined with an Imitation Thatch Roof

THE subject which forms the basis of our colored supplemental plate this month is a country house in which stone and stucco have been cleverly blended for the main stories, while the roof is of imitation thatch. The wide massive chimney with its projecting buttresses and arches over the entrance porch bring it in harmony with the first story walls. The aim of the designer has been to produce a structure embodying qualities of texture and charm of character as to the materials used which cannot fail to appeal to the critical eye. The floor plans, elevations and miscellaneous details will be found on the two pages which follow.

The entrance is through a vestibule connecting with a central hall having the dining room on the right and the living room on the left. A large corner fireplace is a feature of the living room, while the dining room has as features a built-in china closet and a huge stone fireplace with generous hearth.

Details of Construction

According to the specifications of the architect the foundation walls are of 18 in. rubble masonry, random coursed, on a bed of concrete, the latter projecting 8 in. on both sides. The first story walls are also of random coursed rubble masonry with wide joints. The second story exterior walls, as well as the gables, are of stucco, while the roof is covered with shingles of random width laid unevenly with courses running into each other and tapered on ends and bottom lines of roof to give the thatch effect.

The chimneys are of the same general construction as the main walls and are topped with a blue stone cap. The flues project above the cap about 5 in. and are lined with hard burned tile.

The front and side porches, as well as the terrace in front of the house, are laid with concrete on a bed of cinders, and have a finishing coat of cement, colored a brick red and ruled off to imitate square red tile. The timbers of the house are of spruce, the beams under the first and second floors being 3 x 10 in. well bridged and set into the masonry walls. The studding are 2 x 4 in. placed 16 in. on centers.

The Floors

The rooms of the first story have double floors, the under one being of rough tongued and grooved flooring and the finish floor of 7/8 x 5½ in. maple. The rooms in the second story have single floors of highly figured maple. All window frames are white pine and the doors are oak veneer on a white pine core.

The masonry walls are furred to receive spruce lath, to which three coat plaster work is applied, all rooms having a sand finish. The stud partitions are also lathed and plastered.

The house is piped for gas and wired for electricity with outlets provided in all rooms for com bination fixtures of the latest pattern of Mission or colonial tendencies, according to the taste of the owner.

The Plumbing System

The bath room has a floor of octagonal white tile on a base of Keene's cement. The fixtures are of Standard porcelain make with nickel-plated pipes and attachments. The kitchen and pantry each has an enamel iron sink with brass fittings. A good idea of the plumbing system involved may be seen on one of the plate pages which follow.

The house is heated by hot air and an idea of the general layout may be gleaned from one of the plate pages presented herewith. Where the flues pass along walls metal lath is used instead of wood lath. The pipes connecting with the heater are to be asbestos covered and the system connected with a fresh air inlet box to allow of direct heating with fresh air.

All exterior trim has three coats of paint and the roof shingles were given two coats of dark brown shingle stain. Interior wall trim on the first floor is stained and varnished brown, while the second floor is finished with three coats of silver gray enamel paint. The floors of the dining and living rooms are filled and varnished and all other floors are varnished. The hardware throughout is of Mission style in a dull finish.

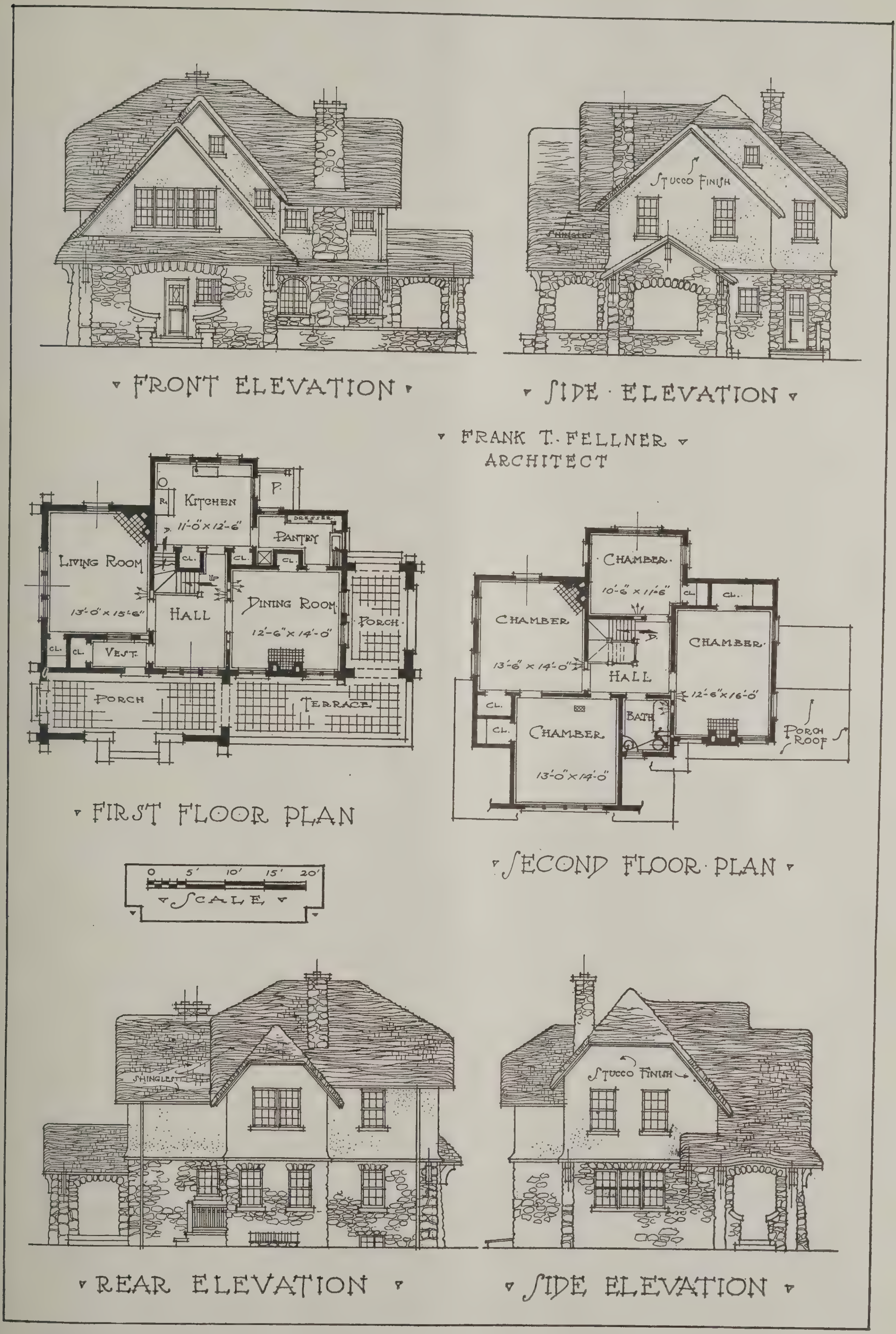
Estimate of Cost of Labor and Materials

The estimate of cost based on a cubic contents of 28,929 cu. ft. at a unit price of 21 cents per cu. ft., is given by the architect as $6,075. This is distributed as follows:

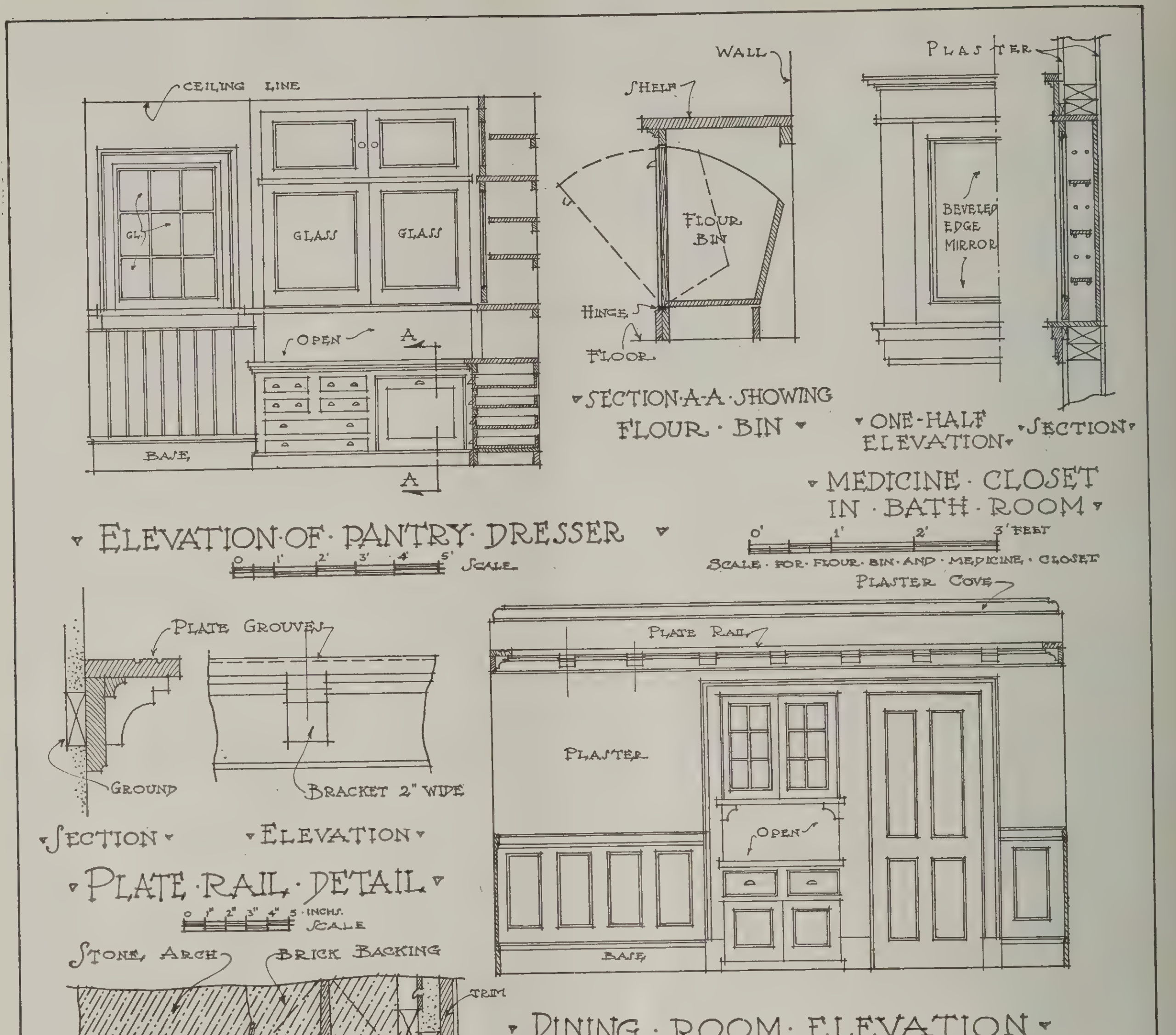
Excavating	$50.00
Grading	42.00
Masonry, chimneys, etc.	2,152.00
Cement, concrete	700.00
Plastering	333.00
Carpentry and mill work	1,207.00
Painting	200.00
Heating	310.00
Plumbing	360.00
Mantels	40.00
Metal work, tiling, etc.	466.00
Gas and electric work	160.00
Hardware	55.00
	$6,075.00

The house here shown was designed by Frank T. Fellner, architect, care of *The Building Age*, or 413 Caton Avenue, Brooklyn, N. Y.

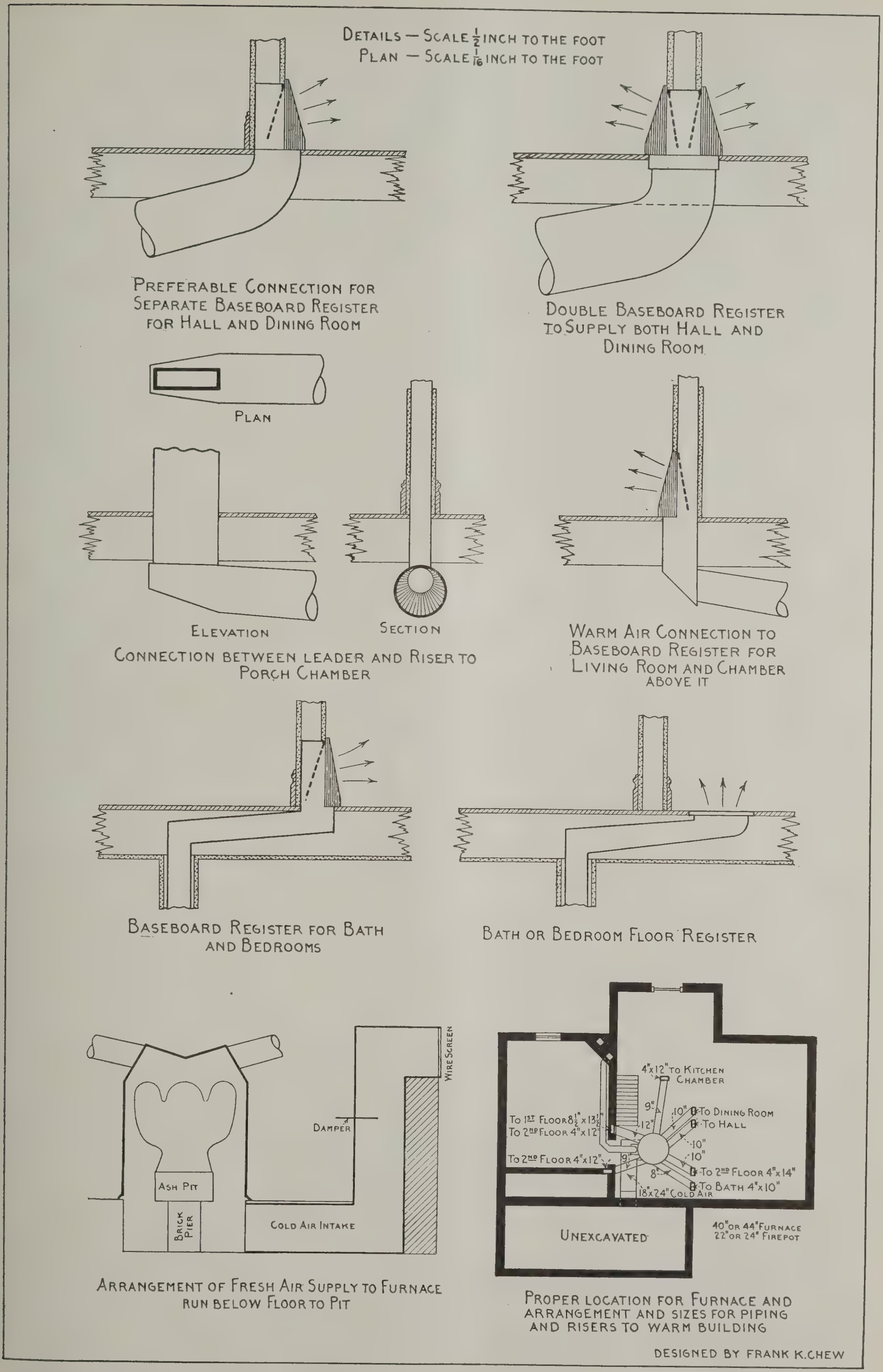
The annual meeting of the American Forestry Association was held in Washington on January 14. A president, twenty-one vice-presidents, a treasurer, an auditor and five directors were elected and plans made for an active campaign for forest conservation during 1914.



Elevations and Plans of the Country Residence of Stone and Stucco Shown Upon Our Colored Supplemental Plate this Month



Miscellaneous Constructive Details Relating to the Country Residence of Stone and Stucco Shown Upon Our Colored Supplemental Plate this Month



PREFERABLE CONNECTION FOR SEPARATE BASEBOARD REGISTER FOR HALL AND DINING ROOM

DOUBLE BASEBOARD REGISTER TO SUPPLY BOTH HALL AND DINING ROOM

CONNECTION BETWEEN LEADER AND RISER TO PORCH CHAMBER

WARM AIR CONNECTION TO BASEBOARD REGISTER FOR LIVING ROOM AND CHAMBER ABOVE IT

BASEBOARD REGISTER FOR BATH AND BEDROOMS

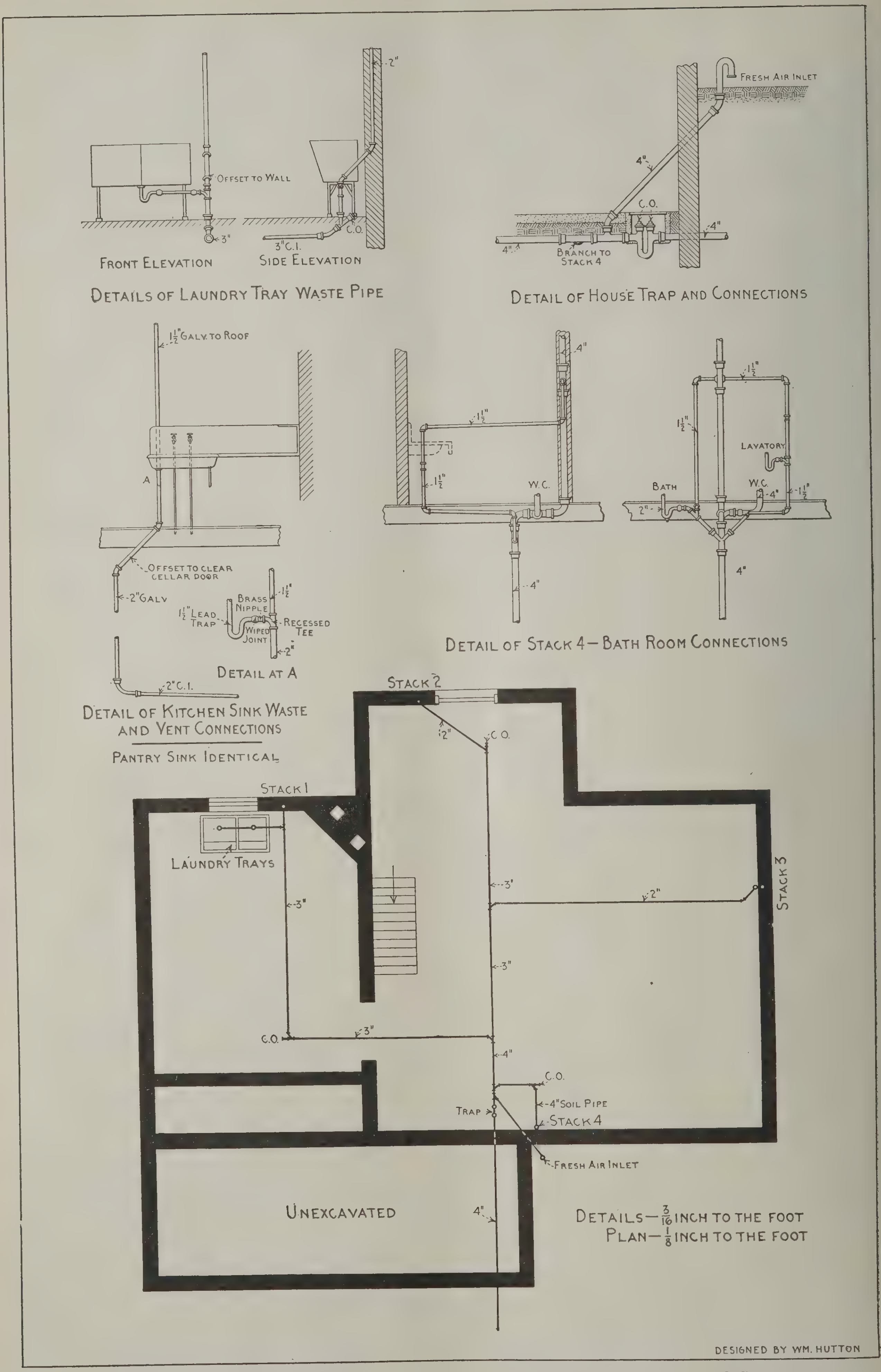
BATH OR BEDROOM FLOOR REGISTER

ARRANGEMENT OF FRESH AIR SUPPLY TO FURNACE RUN BELOW FLOOR TO PIT

PROPER LOCATION FOR FURNACE AND ARRANGEMENT AND SIZES FOR PIPING AND RISERS TO WARM BUILDING

DESIGNED BY FRANK K. CHEW

Details of the Furnace Heating System of the Country Residence of Stone and Stucco



Details of the Plumbing System of the Country Residence of Stone and Stucco

BUILDING AGE
NEW YORK

New York State Association of Builders

Nearly 200 Delegates Representing 28 Cities at the Eighteenth Annual Convention Held at Rochester

THE delegates who assembled in Rochester to attend the eighteenth annual convention of the New York Association of Builders held January 27 and 28 with headquarters at Powers Hotel numbered nearly 200 and represented 28 cities. On the evening prior to the regular session of the convention there was an executive meeting in the parlors of the hotel at which Lewis Harding of New York City, chairman of the committee, presided. At this meeting there were about 50 members of the committee present and the session was devoted to a consideration of various phases of the work of the State Association. E. A. Keeler of Albany gave a somewhat extended report of the work of the General Welfare Committee. Following the executive meeting the local entertainment committee provided some good things to eat, drink and smoke, and a spirit of good-fellowship generally prevailed.

Wednesday Morning Session

The regular session of the convention opened at half-past nine on Wednesday morning, January 28, when the roll call of members and delegates showed the attendance to be as stated above. The meeting was called to order by William M. Friederich, president of the Rochester Builders and Traders Exchange, who in behalf of that organization bade the delegates welcome. He then introduced Mayor H. H. Edgerton, of Rochester, who also extended a greeting, and to these addresses of welcome George L. Swan, president of the State Association of Builders, made response.

The President's Address

After these formal introductions President George L. Swan submitted his annual report, from which the following are brief extracts:

"The Compulsory Workmen's Compensation Act has become a law and shortly will be effective. The State Association can congratulate itself over the aggressive steps taken in opposing the passage of the Murtaugh-Jackson Bill. There was little that could be done in opposing the objectionable features of the Workmen's Compensation Law now in force. This convention will take under consideration amendments to the existing law as we may deem best for our interest.

In connection with the Workmen's Compensation Law I am led to believe that the Governor of the State is about to appoint the commission which will have charge of the investigating of injuries sustained by workmen and the disposition of the compensation fund. I would recommend the Association to take up the advisability of prevailing upon the Governor, if possible, to appoint upon this commission a builder, either active or retired, whose qualifications shall be such as to make him thoroughly familiar with the building industry.

Another work of great importance done the past year was the appointment of a committee known as the General Welfare Committee, with E. A. Keeler, of Albany, as chairman. This committee has done a very creditable work; subdividing into different working bodies. I am informed the chairman of this committee will give a detailed report of the accomplishments of this movement and I would recommend the committee be continued in operation the coming year and that the proper expenses in connection with this important work be cared for out of association funds.

The association worked in co-operation with Syracuse in the handling of its labor troubles. I am satisfied that the acquaintance and co-operation developed through the agency of the State Association was a large factor in the handling of labor problems arising in our cities and centers.

I desire to express my thanks and appreciation for the very generous response of our members during the past year when called upon by the Legislative Committee in legislative matters, carrying out instructions promptly and appearing in person at the Legislative and Executive Chambers in Albany when requested."

Report of Secretary Carter

After the President's address the secretary submitted his annual report, from which the following are extracts:

The wage scale showing wages paid mechanics throughout the state was revised and printed and copies sent to the membership.

On May 12, when the builders of Syracuse were having controversy with their laborers, information was obtained from the cities throughout the state as regards the working rules and wages paid laborers and the data was passed on to Syracuse for their use. I have been informed this information was a factor in the ultimate developments of the Syracuse controversy.

The General Welfare Committee appointed at the last meeting, with E. A. Keeler, of Albany, as chairman, has done splendid work during the year. The committee as a whole met in Syracuse, February 16, 1913, and the result of this meeting was the successful reorganization of the Syracuse body and their affiliation with the state association.

The State Association was very aggressive in opposing the passage of objectionable compensation laws presented at the first session of the Legislature of 1913 and sent various delegations to Albany in opposition to these bills.

The secretary has reports from various assemblymen concerning the meetings in Albany to oppose the passage of the Murtaugh-Jackson Bill and heard statements to the effect that the objections lodged there were made by the most forceful gathering of business men that had ever opposed a measure in Albany.

Enough cannot be said of the good work along legislative lines done by the Legislative Committee of the Building Trades Employers' Association of New York City, the counsel of the State Association and his associate, Hary N. French.

Report of Counsel

Counsel of the State Association of Builders, Eidlitz & Hulse of New York City, were represented by their associate Harry L. French, who submitted the Report of Counsel. The following extracts are presented:

The 136th session of the Legislature of the State of New York will long be remembered in history for reasons so obvious to all of you members of the State Association that it is unnecessary for me to suggest them here. From almost any point of view it was a remarkable session. Beginning on Wednesday, Jan. 1, the regular session continued without break (except for the usual week-end adjournments) until Saturday, May 3, when it adjourned *sine die* without enacting a direct primary law satisfactory to Governor Sulzer. For that reason, the Governor called the members of the Legislature together on the 16th of June, 1913, in extraordinary session, which lasted until Friday, Dec. 12, so that the Legislature was in session practically the entire twelve months of 1913.

During that time it entered on its calendars 4205 bills, or, if we include those bills reprinted and re-introduced, the record number of 5479. There were 836 of these bills approved by the Governor and have become laws.

Counsel examined all of the bills which were introduced. With many of them a casual reading sufficed to show they did not affect the members of this association as builders, but 144 were, in the opinion of counsel, worthy of the most careful consideration. These 144 bills were discussed and deliberated upon by the Legislative Committee and individually by the members of your Executive Committee. There were 72 bills opposed by the Legislative Committee on the ground that they would adversely affect the interests of the builders of the state. At this place may I say how much counsel appreciates the public-spirited and unselfish attitude of the members of the Legislative Committee exhibited at the meetings of the committee? The test applied by them to every bill considered was whether or not it would benefit the citizens of the state as a whole, and not one member failed to dignify his position on that committee by his vote on every bill. A large majority of the bills voted to be opposed by the Legislative Committee quickly fell by the wayside. A few survived only to be cut down by the Governor, and only 11 were enacted into laws.

Of these 11 bills, 4 relate exclusively to New York City, not affecting directly the interests of members of this association outside of Greater New York.

Reports of Delegates

The reports given by various delegates presented touching local working and wage conditions in their respective localities showed that generally speaking there had been an abundance of labor in all trades associated with building lines and that the scale of wages prevailing in 1913 would undoubtedly obtain in 1914. None of the delegates present reported that there had been any strenuous demands made on the part of local labor organizations for an increase in wage scales.

Following these reports the session adjourned, after which the delegates became the guests of the Rochester Builders and Traders Exchange at a luncheon served in the hotel parlors.

After luncheon upon invitation of Mayor Edgerton, the delegates were taken for a brief ride and tour of inspection of the new Exposition Grounds and Buildings, together with a hurried survey of the Automobile Show then in progress at the principal buildings.

Wednesday Afternoon Session

The delegates reassembled at 2:30 in the afternoon when Otto M. Eidlitz, of New York City, gave an extended address on the workman's compensation laws, now in existence. Mr. Eidlitz was a member of the original committee appointed by Governor Hughes to investigate the subject of workmen's compensation, and was well qualified to talk on the subject. He went into considerable detail in explaining the workings of the law and presented the conclusion that the law as a whole was rather equitable, maintaining, however, that the period of disability allowed for certain injuries and the weekly compensation was higher than that given by any other state or country and ventured the opinion that this allowance was really much higher than the building industry could be expected to bear. His contention was that under the present law the allowance for the loss of an arm in many instances would be in the neighborhood of $6,000, which was a greater amount than had been allowed under the statutes of New York up to some few years since, for the death of a person; that under the existing law the employer might have a liability ranging from $20,000 to $30,000 as compensation for total disability of the employee, or in case of death, the deceased leaving a wife and children.

After a general discussion of the subject the Association recorded itself as being opposed to the requirements of the present law as regards the period of partial disability allowed and the obligations that might be occasioned by death.

Report of General Welfare Committee

E. A. Keeler of Albany as chairman of the General Welfare Committee, submitted an extended report of the work done by that committee and recommended that the latter be continued. This recommendation was accepted. The committee consists of E. A. Keeler, chairman, of Albany; M. E. Gregory of Corning, Henry Grieme of Amsterdam, T. H. Swan of Rochester, Henry M. Feist of Buffalo, together with G. L. Swan of Rochester, Harry L. French of New York City, and J. M. Carter of Buffalo, president, counsel and secretary-treasurer, respectively, of the New York State Association of Builders.

It was resolved that the association commit itself as being favorable to the appointment of a practical builder on the Workman's Compensation Commission and the secretary was instructed to communicate with Governor Glynn expressing the desire of the body, which he proceeded to do. The builders of the state feel that there are so many questions of a technical nature that will be referred to this Commission that the practical experience of a builder would be of decided value to all parties concerned.

Election of Officers

The nominating committee as appointed, with Lewis Harding of New York City chairman, submitted its report recommending the present officers of the Association to be continued for the ensuing year. The committee's recommendation was accepted and the following officers installed:

President.......George L. Swan of Rochester.
First Vice-Pres..C. G. Norman of N. Y. City.
Second Vice-Pres..M. E. Gregory of Corning.
Sec.-Treas...........J. M. Carter of Buffalo.
Counsel........Eidlitz & Hulse of N. Y. City.

Executive and Legislative Committee

The President then appointed the following executive and legislative committee to serve for the ensuing year with Lewis Harding of New York City as chairman:

Albany: E. A. Keeler and Jno. J. Kelly.
Amsterdam: H. W. Grieme.
Auburn: R. C. Hall, of Aldrich & Hall.
Batavia: G. J. Glade.
Buffalo: G. C. Schierer.
Canandaigua: R. Hogan.
Corning: J. W. Shea, of Corning Building Co.
Dunkirk: Wm. Meister.
Geneva: T. J. Wright.

Hornell: Lee Denniston.
Jamestown: C. A. Swanson.
Keeseville: C. H. Prescott.
Little Falls: J. D. Clark.
Mt. Morris: C. A. Foote.
Newburgh: H. A. Daniel, of Atlas Roofing Co.
N. Y. City: Wm. Crawford, of Mason Builders' Association.
F. Tuttle, of Mechanics & Traders Exchange.
Niagara Falls: W. H. Gillett.
Olean: Dan Dean and Mr. Taylor.
Oswego: R. M. Barnett, Pres. Builders' Exchange.
Rochester: Fred Gleason, of Builders & Traders Exchange.
J. L. Stewart, of Carpenter Contractors' Assn.
Wm. Friederichs, of Mason Builders' Association.
Saranac Lake: Wm. Callanan.
Saratoga Springs: W. S. Robertson.
Schenectady: P. H. McDermott, Secy. Contractors' Assn.
Syracuse: J. W. Dawson.
Rome: E. H. Owens.
Troy: F. E. Gallagher, of C. Boland Co.
Utica: Wm. Hughes, of Jno. Hughes Construction Co.

The Banquet

In the evening the delegates were the guests of the Rochester Builders and Traders Exchange at a splendid banquet served in Powers Hotel, the toastmaster being E. A. Fletcher of Rochester. After the many good things provided had been given proper attention the delegates were entertained by the following speakers: William M. Friederich, president of the Rochester Builders and Traders Exchange; George L. Swan, president of the New York State Association of Builders; Otto M. Eidlitz, James M. Carter, Judge Willis K. Gillette and Lewis Harding.

Great credit is due the committees of the Rochester Builders and Traders Exchange having in charge the arrangements associated with the convention. These committees consisted of that on "Arrangement," of which William M. Friederich was chairman and G. Henry Fisk secretary; "Hotel and Banquet," of which Lewis S. Whitmore was chairman, and that on "Reception," of which Hon. H. H. Edgerton was chairman.

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Meeting of Illinois Lumber and Builders' Supply Dealers' Association

An excellent gathering in which forceful talks predominated featured the deliberations of the twenty-fourth annual convention of the Illinois Lumber & Builders' Supply Dealers' Association, held at the La Salle Hotel, Chicago, Ill., February 10-12. Meetings were conducted promptly at 2 o'clock each afternoon, and in addition to the reports and business addresses vocal solos and duets were rendered at frequent intervals.

More than 300 members were present at the opening session, President Charles W. Hall presiding. The first order of business was the reading of the president's annual address, this being followed by the treasurer's, secretary's and advertising director's reports, which were well received.

The addresses for the afternoon included a stirring talk on business efficiency by Harry I. Fogleman, of Chicago. After the appointment of Committees on Resolutions, Nominating, Legislation and Auditing, Secretary Emeritus G. W. Hotchkiss entertained the delegates with a talk on "Incidents in a Long Career." He brought out distinctly the merits of the association and the benefits derived from being a member.

On Wednesday afternoon a moving picture exhibit was given on yellow pine lumber operations of the Long-Bell Lumber Co., Kansas City. This interesting feature was followed by talks by Elmer H. Adams on the income tax; W. E. Lyon, Carthage, Ill., on "The Good of the Order," and by short speeches on subjects of interest to members.

The closing session on Thursday was also instructive in the way of moving picture displays and talks, while officers were elected for the ensuing year as follows:

President........L. M. Bayne, of Ottowa.
Vice-pres........P. T. Langan, of Cairo.
Secretary......Geo. W. Jones, of Chicago.
Treasurer.......J. W. Paddock, of Pana.

The seventeenth floor of the hotel was given over to the exhibitors, forty-five rooms being filled. Among the displays of especial interest to our readers were those of F. W. Bird & Son, Walpole, Mass., showing types of Paroid roofing, Neponset papers and wallboard; The Patent Vulcanite Roofing Co., Chicago, with its complete line; The H. F. Watson Co., Chicago, manufacturers of asbestos roofing and roofing papers; The Flintkote Manufacturing Co., Boston, Mass., with its "Rex-tile" slate roofing shingle while representative booths in Portland cement were maintained by the Universal Portland Cement Co., the Marquette Cement Manufacturing Co., the Atlas Portland Cement Manufacturing Co., the Chicago Portland Cement Co., and the Lehigh Portland Cement Co., in addition to some excellent displays by lumber merchants and sash and door manufacturers.

◆

Award Contracts by Architects Instead of General Contractors

At the recent convention of American Institute of Architects held in New Orleans, La., a resolution was adopted relative to the award of contracts for heating and plumbing by the architects instead of the general contractors. The resolution reads as follows:

"*Resolved:* That the American Institute of Architects in convention assembled recommends to the members of our profession the adoption of the practice or direct letting of contracts for mechanical equipment, such as heating apparatus, plumbing, and electrical equipment. This recommendation is based on the conviction that direct letting of contracts as compared with sub-letting through general contractors affords the architect more certain selection of competent contractors and more efficient control of execution of work and thereby insures a higher standard of work, and, at the same time, serves more equitably the financial interests of both owner and contractor."

◆

Workers Build Home in One Day

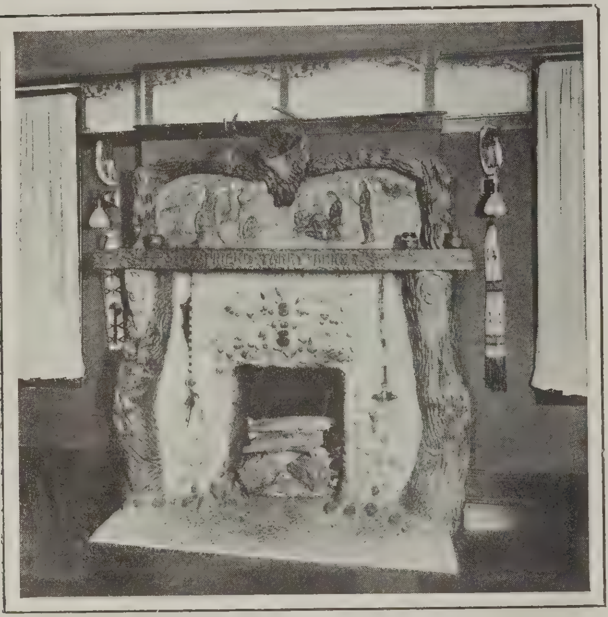
With lumber, nails, fixtures and other materials donated by various firms in Bakersfield, Cal., thirty-one carpenters, bricklayers, plumbers and electricians recently built in seven hours a house for a destitute family, consisting of a mother and five children. The house is wired for electricity, piped for gas, contains complete plumbing fixtures and connections with sewer and water mains. At 9:15 o'clock in the morning the small army of workers invaded the vacant lot, donated by a real estate firm, and completed the cozy structure before quitting time.

Two Examples of Craftsman Mantels

One Made of Stones and Cement Judiciously Combined; the Other Having Oak Pilasters as a Frame Work

By J. R. Schmidt

GETTING close to Nature in one's own home and the recalling of the early pioneer days when the Indians roamed the forests is the idea being carried out in the unique woodcraft mantels now being built in some Cincinnati homes.



A Woodcraft Mantel and Fireplace in the Dining Room of a Cincinnati Home

One of these original and unique mantels made entirely of stones and cement is shown in the log cabin den of a Cincinnati home. Its crudeness takes one back to the pioneer days, and this fact is further strengthened by the scene, crudely molded, of the pioneer and his dog and his caravan slowly and cautiously wending their way through the forest. To make this scene really crude in its execution and in keeping with the ideas of the mantel, the scene was made with a single crude instrument which added that touch of crudeness which modern instruments would have lost. The primeval idea is completed by the little old-fashioned oil lamp and the other trinkets upon the mantel and the crude pictures framed alongside.

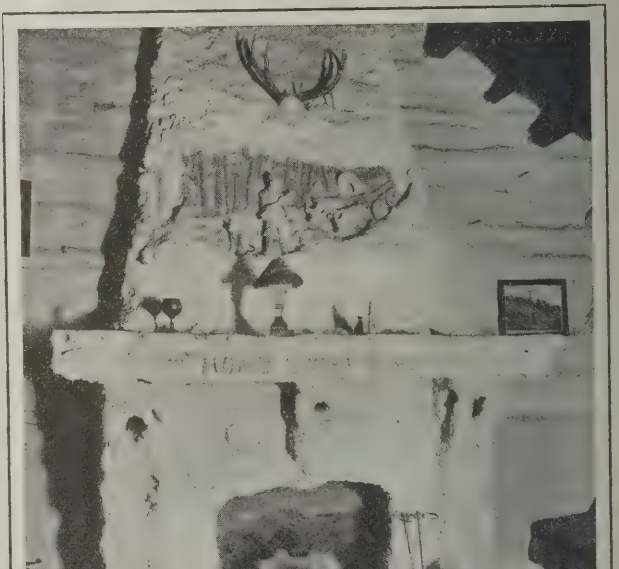
The other mantel shows the woodcraftsman idea in a more elaborate execution. This is in the dining room of a Cincinnati home. While cement and stone largely predominate, there are pilasters of oak showing the gnarled and twisted beauty of the wood much as it was found when cut in the forest. The boulders and stones are some selected from those which are scattered along the banks of the Little Miami River. The Indian heads are characters of the Indian braves who roamed the banks of the stream. The scene represents a peace meeting between the Miami Indians and the early pioneers who invaded the historical Little Miami Valley.

The Indian arrow heads imbedded in the cement and the other Indian implements used as ornaments are the products of the Indian mounds which abound throughout the Little Miami Valley.

This novel departure in mantel building is being executed by Louis Kuertz, of Hazelwood, Ohio, a woodcraftsman who secures from the forests and streams about him the material for this unique work. These raw materials he combines with cement into fireplaces which rival the fireplaces of the old log cabin type.

◆

The old buildings facing the Waldorf-Astoria Hotel on West 33rd street, New York City, are about to be torn down to make room for a 12-story loft structure for which plans have just been filed. It will have a frontage of 200 ft. on 33rd street and will extend through to 32nd street, on which it will have a frontage of 25 ft. It will be fireproof throughout and have a façade of brick, limestone and terra cotta. The plans were prepared by Herman L. Meader, who estimates the cost at $500,000.



Cement Mantel in the Log Cabin "Den" of a Cincinnati Home

Two Examples of Craftsman Mantels

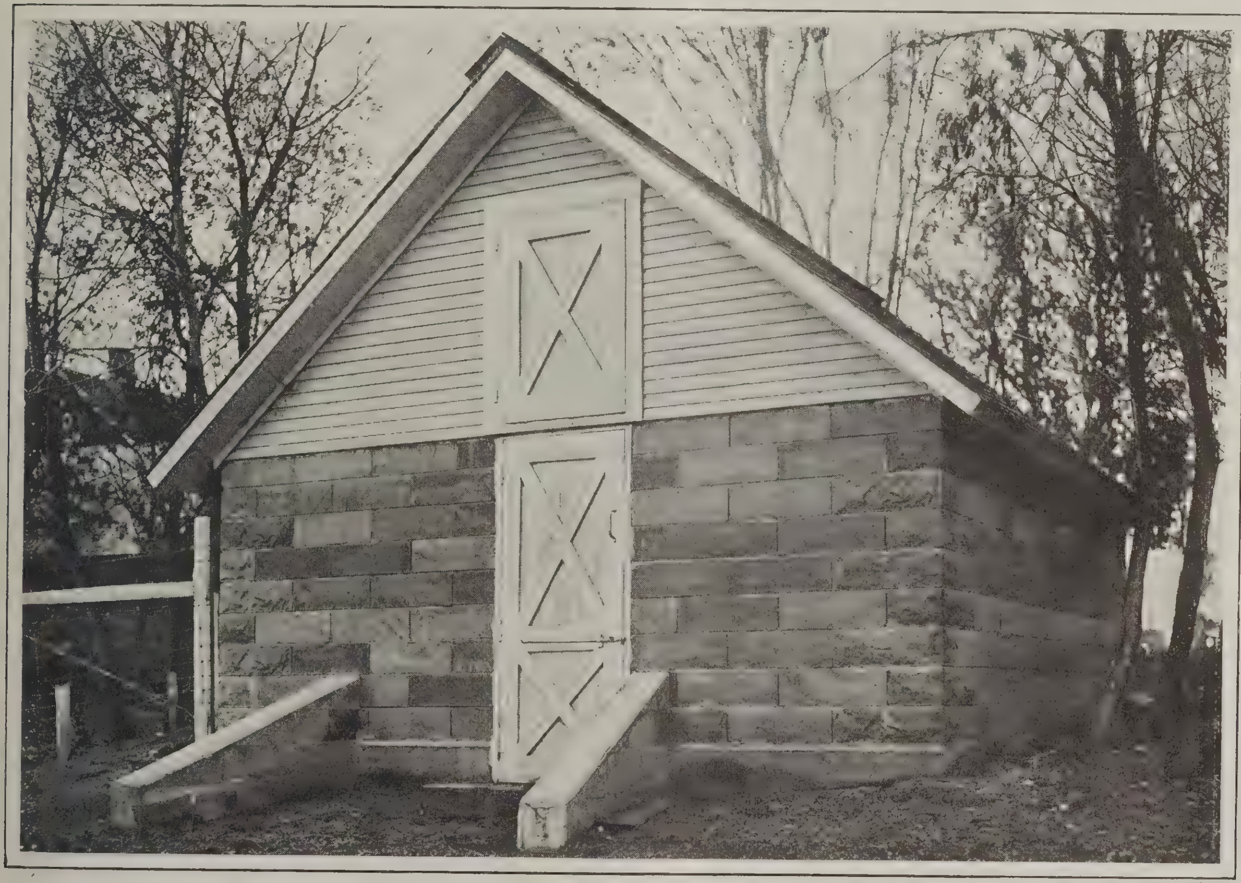
Constructing a Concrete Ice House

A House Built with Double Walls and Having Continuous Air Space—Capacity for 60 Tons

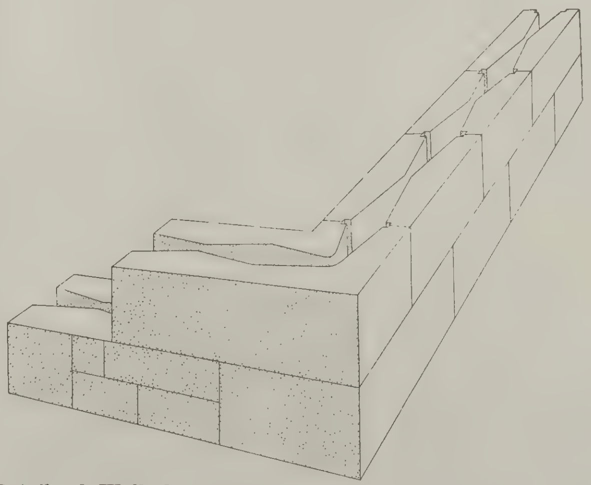
AT the present day when dairy farms are multiplying all over the country one of the prime requisites to success is an adequate supply of ice constantly at hand during the hot months of the year. In the construction of an ice house insulation against the transmission of heat from the outside through the walls is therefore one of the first essentials. To insure this insulation the walls, the floor and even the roof of the icehouse should be built in such a way as to satisfactorily accomplish this purpose, while ventilators should be provided in the roof to prevent the accumulation of warm air underneath. Insulating materials, it is well to remember, are always much more effective when dry than when wet, and for this reason it is important that the house be constructed of materials which will not allow moisture from the melting ice to reach the insulating medium.

An excellent plan for constructing an icehouse in a way to insure proper insulation is to build the walls of concrete, making them double, with an air space between the inner and the outer one, and extending from the foundation to the roof. A good example of this sort of construction is illustrated upon this page. The picture clearly shows the appearance of the finished structure and the doors through which the ice is taken.

Here the walls are constructed of what is known as continuous air-space blocks, the appearance of a corner of the ice house being indicated in the



Constructing a Concrete Ice House—General Appearance of the Finished Structure, Showing Doors Through Which the Ice is Taken



Detail of Wall Construction at the Corners, Showing the Continuous Air Space outline sketch at the bottom of the page. These blocks are 8 x 24 in. in size and run in width all the way from 8 to 12 in. All blocks are tied together in the wall by four ¼-in. galvanized iron rods 8 in. long and turned 1 in. at each end. A wall constructed in this way is said to be entirely frost and moisture proof.

The ice house shown in the photograph is 16 x 24 ft. in size and extends 6 ft. in the ground and 8 ft. above grade. The walls in the ground are of solid concrete, while above and up to the wall plates they are of cement blocks as already described.

The house is built on a gravel knoll, the bottom or floor being of coarse sand, so that there is no need to provide for drainage. There is a space of 8 in. or 10 in. between the wall and the ice when the latter is packed in the house, and this space is filled with sawdust or chaff.

The doors are double with air space between and baseboards are put on inside of the door frame and straw packed in between the doors and the boards.

The roof is covered with shingles with an air space under the ridge row. The house has a capacity for fully 60 tons of ice, and this is said by the owner to be sufficient to provide three farms with all the ice they need during the summer months.

The ice house here shown was built by Henry Hanson on his Echo Valley Farm at Odebolt, Iowa, and the continuous air space concrete blocks used in the construction of the main walls were turned out on one of the machines of the Anchor Concrete Stone Company, Rock Rapids, Iowa.

◆

A Freak Store Building

Reference has occasionally been made in these columns to buildings of odd construction occupying diminutive sites and used for store or dwelling purposes, or possibly both, but in Vancouver, B. C., there has recently been commenced a freak structure which occupies a site only 6 ft. wide and with a length of 120 ft. It belongs to Chinese interests, will be four stories in hight, of steel-frame construction, and the unusual site grows out of the fact that in widening the street the city appropriated all of the property except a strip of the dimensions given. The ground floor will be divided into six stores and these will be so small that people may not enter them to make purchases but will do their buying from the sidewalk. So narrow is the proposed building that above the ground floor it is necessary to have a continuous row of bay windows in order to provide space for the spiral staircase which leads to the upper floors. The latter are devoted to sleeping rooms, while the basement will be occupied as a restaurant. The work of construction is being done by Chinese labor.

◆

The Cost of Brick Houses

The claim has been made by a writer in one of the trape papers devoted to the manufacture of clay products that the high cost of constructing brick buildings is due mainly to the bricklayer. He states that brick, while comparing favorably as to cost of material laid down on the ground with that of any other material, costs more in the building. In other words, it is not the material that makes brick houses cost more but the labor that puts it in place.

Further investigation showed these facts: That bricklayers receive $6 a day of eight hours with a helper to each bricklayer who receives $4 a day and with a limit of 1,000 brick per day's work.

"It is the bricklaying that is at the bottom of the entire problem," said one dealer when approached to offer some solution. "The manufacturer has minimized the cost of making his product by the installation of modern methods, but has overlooked the fellow who puts his product into the walls.

"There is a scarcity of bricklayers now, but if we could turn them out like trade schools turn out printers, carpenters and others, there would be a different story. Look at the electricians. Why, a few years ago it was almost impossible to get a competent electrician at a reasonable price. To-day, however, it is different. They are still getting good wages, but they are doing more and better work."

It was suggested that the union bricklayer argued he was not getting more than a living wage.

"Let him have his $6 a day," replied the manufacturer. "I don't begrudge him his wages. What I do kick about is the output. He limits himself to 1,000 brick a day, and yet it is a poor bricklayer who cannot put 3,000 brick in a wall every day in the week. That makes quite a difference, doesn't it, when you begin to to figure the construction cost? Take, for instance, common brick here in Chicago. You can get them laid down on the job at $6 per 1,000. Yet you've got to pay $10 to have them laid in the wall—or $4 per 1,000 more than they cost to manufacture.

"We want the restrictions taken off the amount of labor a man can do in a day. If he can lay 2,000 brick or more, let him do it. Then, too, there is the question of helper. By the rules of the union every bricklayer must have a hod carrier, who must be paid $4 a day, yet where there are a dozen bricklayers on the job one or two would be sufficient."

—*Record and Guide.*

◆

Decadence of the Two-Family House

In some of the eastern cities the two-family house seems to be waning in popularity, if one may judge from the lessening number built from year to year. In the city of Brooklyn but few of this type of dwelling were erected in the last two years. "Instead of considering first the economy and cost of construction or the economies that flow from the greatest utilization of space, builders must hereafter take into consideration more fully the comfort and health of the family," says Lewis H. Losee, vice-president Lawyers' Title Insurance & Trust Co.:

"In apartment house construction there must be larger rooms, lighter rooms and larger airshafts. It is gratifying that the unit in construction has steadily increased during the last seven years, until now apartments are being built on plots 50 and 60 ft. in width, thus furnishing the opportunity for better distribution of space.

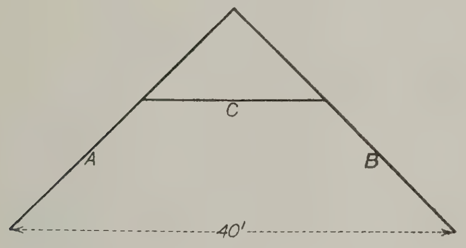
"One of the best features in the Brooklyn situation is the approach of the time when better transit facilities will be an actuality. Already there is evidence that the real estate speculator is beginning to anticipate the reality of improved transit."

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

Construction of Church Roof Truss

From C. D. P., Marble Falls, Texas.—Will some reader tell me the best known method of building an arched ceiling roof having a span of 40 ft. I want A, B and C of the accompanying sketch to be equal in feet and inches. The roof is to be of one-half pitch. I am building a church here and would like very much to have the readers give this prompt attention.



Construction of a Church Roof Truss

Architects, Drawings for Millmen

From John Wavrek, Jr., Penn.—By way of well meant and kindly advice I desire to call the attention of our good friends the architects, to an inconsistency which is often practiced by some of them in making detail drawings of building construction. Not so much is this the case with the older and experienced draftsman as it is with the younger ones. If one of these offending persons would for one year assume the thankless job of estimator for a planing mill, he would find out to his sorrow to what extent this fault is practiced.

We will give him a ¼-in. scale drawing of an ordinary medium-priced dwelling to set out the mill work list. This drawing shows a simple treatment of a box cornice, consisting of crown mould, facia, plancier and frieze; which is all right, but there is no bed mould shown. He gets his sizes as near as possible from the ¼-in. scale drawing, which is all he has from which to get his data, there being no detail drawings made at this time.

Being desirous of getting the job for the mill he will try to keep strictly to the data shown so as not to run too high in his estimate. In the course of time the contract is awarded to his firm and it is time to get out the mill-work for the house.

At this stage of the proceeding there will be detailed drawings made by the architect who drew up the plans, or under his instructions, and are forwarded to the mill. Upon looking over these details the estimator often finds to his consternation and sorrow that the different features which were shown so simply on the ¼-in. scale drawing have been considerably elaborated and additions made thereto. What is the estimator going to do about it? He can make a kick surely but it will avail him little and will be obliged to furnish the stock as per details. Where the crown mould measured about 4 in. on the plan it is probably detailed 6 in. which makes a big difference if the job is large, containing hundreds of feet of cornice.

Recently we had a case of this kind which was extremely faulty in this respect. The ¼-in. scale drawing showed a very simple treatment of the cornices and was simple in all respects; but when the time came to furnish the mill-work the owner required a heavy box cornice with boxed brackets 18 in. on centers and in fact at all points he wanted a much more elaborate job than was shown on his drawings. Of course the man was told that his job would cost him more than the figure given him, which fact did not impress him very favorably, but he was fair-minded enough not to make much fuss about the matter. However, when he gets his bill of "extras" he will surely make a kick.

Another case which we had to contend with was for a row of eight houses. The ¼-in. scale drawing did not show any bed mould at the cornice. The dormers, gables and rear cornices were drawn very simple, showing crown mould, facia and narrow frieze with very little projection. Of course these were listed as shown on the plans and fig-

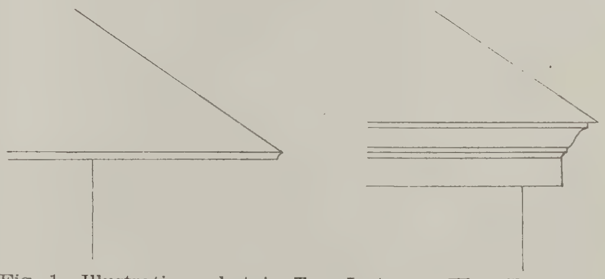


Fig. 1—Illustrating what in Two Instances Was Shown on the Drawings

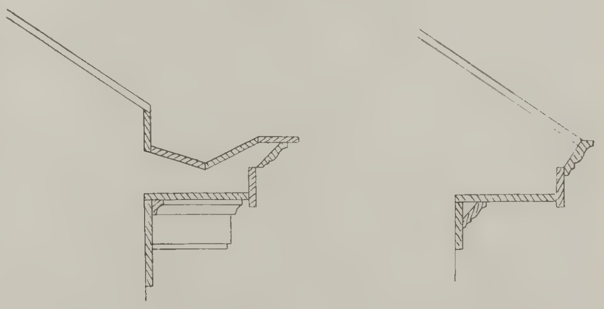


Fig. 2—What Was Really Wanted in the Two Cases

Architects' Drawings for Millmen

ured accordingly. When the detail drawings came for this work a 4 in. bed mould was added on the main cornices of which no intimation was given on the original ¼-in. scale plan, and the contractor required that we include this bed mould for all the cornices; that is, dormers, gables and rear. Taking into consideration the fact that this work was for a row of eight houses, it will be realized that this addition to the details meant many dollars to the planing mill.

There was some strenuous objection made to this demand but the contractor claimed that we should have known that there was a bed mould required. Certainly one could imagine several things that should be added to make the job look well, but that is not the business of the man who makes the estimates. It is his business to list what he sees on the plans and rightly so; what he imagines he must allow to dissolve in thin air.

I know perfectly well without having it cast up to me that it is not possible to show everything in detail on a ¼-in. scale drawing, but the experienced architect will make a good effort to show what he intends to have his work look like and the difficulty is not so much with him as it is the serious negligence of the bungler who styles himself an architect. Ah, poor, abused word.

I am sure that the man whom we have put on the job of estimating for the planing mill for one year, would at the end of that time have acquired a stock of knowledge which would make him a much wiser man, and he would raise his voice most strenuously in a mighty protest against the indifferent drawings which many draftsmen make.

In the accompanying sketches are shown some of the "before and after" cases with which we have to contend.

As stated at the outset this is meant to call upon all conscientious architects to overcome some of these defects and make the estimator's job a less thorny one.

Proportions of the Gambrel Roof

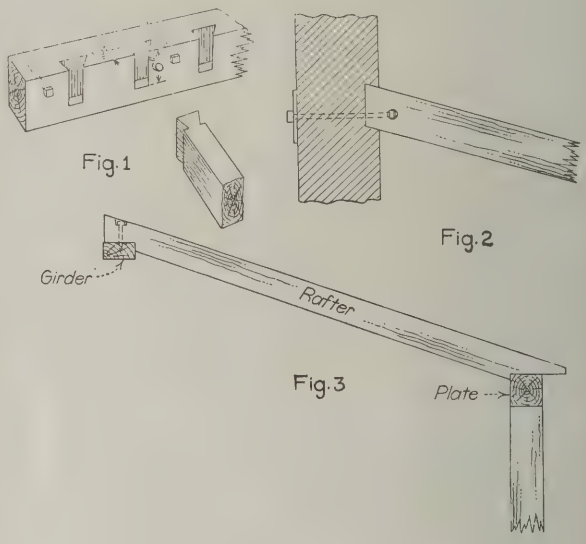
From R. W. W., Dayton, N. Y.—I have read the interesting article by David Gates, Winnebago, Minn., which appeared in the Correspondence Department in the January issue regarding proportions of gambrel roofs, and also his attitude toward the younger element in the trade. I am glad to learn from what he says that he has not a grouch, like many of the old carpenters I know. Most of them will not show a young workman anything, but are quick to find mistakes. I know young men who would work steadily for a year with some carpenters, and then would not know how to lay out a common rafter for a square-cornered building. Speaking from the viewpoint of a young carpenter I wish to say it is exceedingly difficult to get along nowadays and learn the trade when working with these old veterans.

Regarding the proportions of a gambrel roof for barns I would say in answer to the inquiry of Mr. Gates that the rafters should be half pitch for a regular gambrel roof. However, in this section the lower rafters are made shorter than the upper ones. The method of determining the pitches for a roof of the kind indicated and which is a good proportion is that illustrated in the February issue of the paper, page 56, by "J. G. M.," Milton, Wis. It is the same as we use in this section of the country.

From John Sauer, Morrisonville, Wis.—In answer to the query of David Gates, Winnebago, Minn., I would say that my method of proportioning a gambrel roof is to make the upper and lower rafters of equal length. The pitch of the lower rafter can be about 60 deg. and of the upper rafter about 30 deg.

Laying Out a Shed Roof

From D. P. B., Bedford, N. Y.—An error often made by inquiring correspondents is exemplified in the query of "W. F. D.," Clymer, Pa., in a recent issue and that is lack of definiteness. There is no "best method" for a shed or lean-to roof. The best method depends on the building against which the shed is to lean. On one occasion I set one up against a veneered brick building. I used a 3 x 8-in. ledger and dovetailed the rafters into it as indicated in Fig. 1 of the accompanying sketches. I drilled through the brick to strike the studs, then I bored the studs and bolted the ledger to the wall with lag screws. On another occasion when I was a callow youth I drilled through a solid brick wall, grooved the under side of the rafters and rodded the plate to the building after cutting supports for the rafters in the brick. Now I would do the job as I have sketched it in Fig. 2.



Laying Out a Shed Roof—Various Details

If I were putting a shed against a barn I would cut the rafters on top of the girder as indicated in Fig. 3. If the building was of balloon frame and I could get at the studs I would cut through and fasten the rafters to the studs. Every lean-to will come under one of these examples.

Practical Value of "The Building Age"

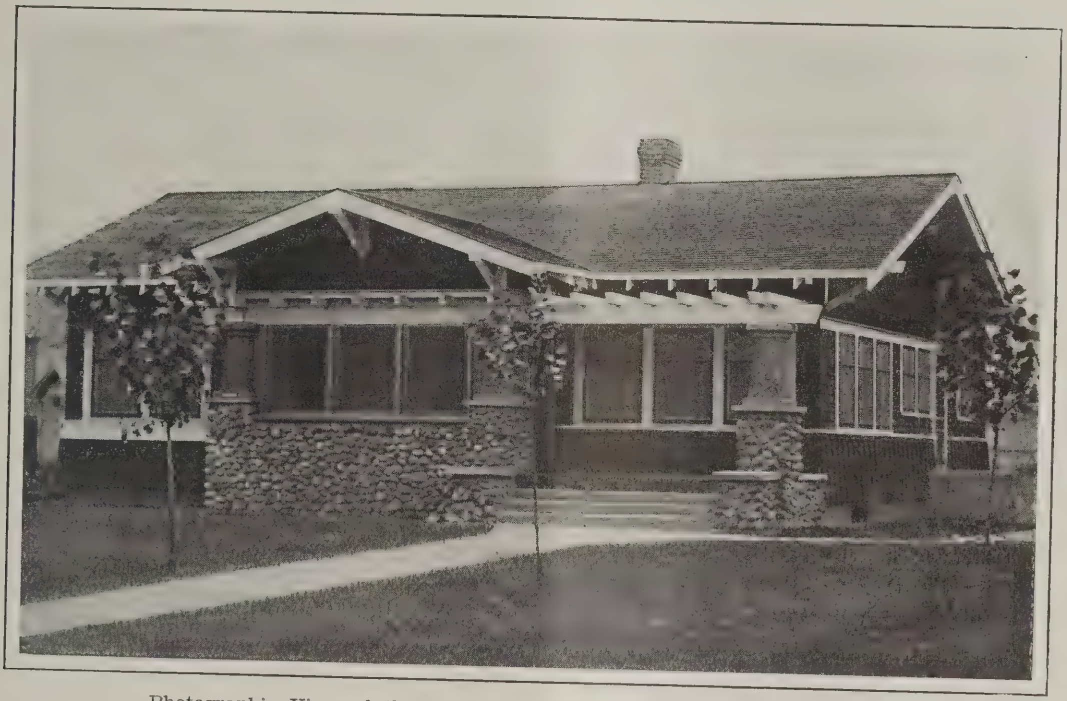
From G. H., Greenville, Miss.—In renewing my subscription to *The Building Age* for two years more I want to say that I am the man who got in trouble over the use of a certain kind of plaster in connection with the construction of a church, and I asked your legal department to help me out. The comments outlining my legal rights in the case were published in the issue of the paper for August, 1913. This covered the case so thoroughly and efficiently that the information proved of great help to me and my attorneys.

The case went to trial, the plaintiffs being the richest and largest church in this section, and I won—something which no one thought I ever would—for the jury gave me a verdict of $2,100 out of $2,300 for which the suit was brought. I understand that there were eleven men on the jury who wanted to give me the whole amount claimed.

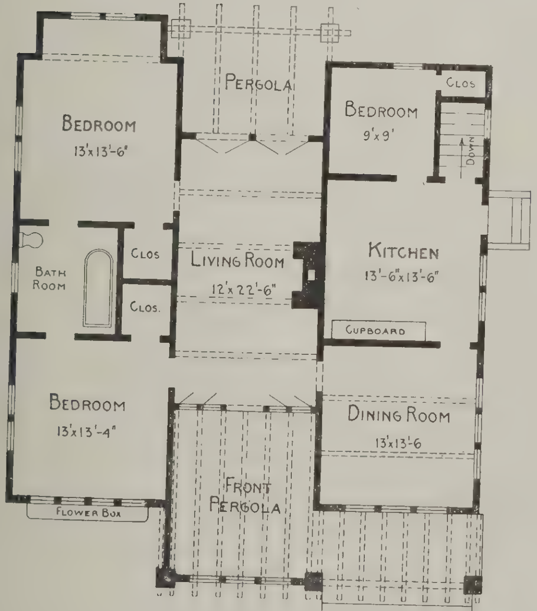
I take this opportunity of thanking Mr. Street, the author of the article in the August issue for the service which he rendered.

A Six-Room Bungalow

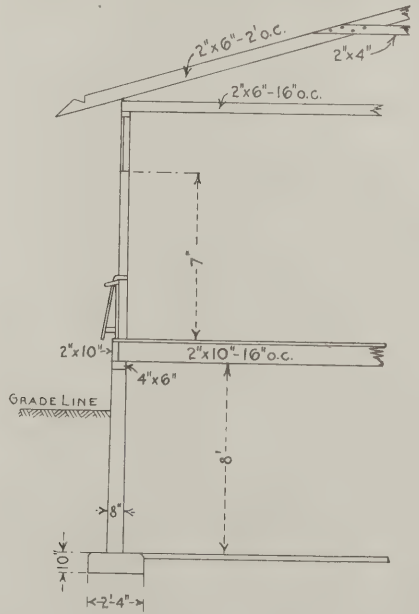
From O. Finwall, Brooten, Minn.—Last summer I erected for a doctor in this place a six-room bungalow which may possibly interest some of the readers of *The Building Age*, and I am therefore sending herewith a photograph and floor plan showing the arrangement of rooms and the appearance of the finished building. It will be seen from an inspection of the plan that the living room occupies the center of the house and is lighted by French casement windows and doors which give out upon pergolas at front and rear. At the right of the living room are two bedrooms with ample closets and also a bath room which communicates with each bedroom. At the left of the living room are dining room, kitchen and a servant's bedroom. The stairs leading to the cellar are reached directly from the kitchen.



Photographic View of the Completed Bungalow As Built by Mr. Finwall



Main Floor Plan—Scale 1/16 In. to the Foot



Section Showing Various Dimensions—Scale 1/8 In. to the Foot

A Six-Room Bungalow—O. Finwall, Builder, Brooten, Minn.

The framing timbers include 4 x 6-in. mud sills, an 8 x 8-in. girder of rough pine, 2 x 10-in. floor joist, and 2 x 6-in. ceiling joist placed 16 in. on centers; 2 x 6-in. rafters placed 2 ft. on centers; 2 x 4-in. collar ties and 2 x 4-in. studs and plates, the outside studs being 10 ft. in length. The pergola beams are 4 x 6 in., the girder supporting them is 6 x 10 in. and the posts at the rear pergola are 8 x 8 in.

The outside trim of the bungalow is white pine and below the window sills the exterior covering is 1 x 12-in. rough white pine boards, with 1 x 3-in. batton strips over the joints as shown in the photograph and a 2½ x 3-in. rabbeted water table above. The roof is built with 2 x 6-in. rafters having molded ends extending out to receive the gutters. The walls of the building above the sill course and the entire roof are covered with red cedar shingles laid 4½ in. to the weather on the roof and 5½ in. to the weather on the side walls. The ridges are ⅞ x 8-in. rough pine and the barge boards are 2 x 8-in. molded and cut out to receive the gutter and supported with molded brackets. The top member is 4 x 6 in. The member against the building is 2 x 6 in., the brace 3 x 6 in. and tie brace 2 x 2 in.

The projection of the roof is ceiled with ½ x 4-in. V-center, V-tongued and grooved Oregon pine ceiling. A 2-in. bed molding is cut in between the rafters at intersection with side walls, and also in the angle of the side walls with the soffits in the gable ends while a ⅞ x 2-in. strip is placed over the barge boards and just under the shingles to cover the ends of the roof boards.

The sash of the double windows is 1½ in. thick and hung with No. 7 Silver Lake sash cord with steel axle pulleys and weights. The French windows have rabbeted meeting rails with astsagal mold on the outside of the sash.

All outside doors have 1¾-in. rabbeted frames while the inside doors have ⅞-in. frames with ⅜ x 1½-in. stops. The front door is of oak 1¾ in. thick.

The floors in the living room and dining room are red oak and those in the bedrooms and kitchen are hard maple.

Flemish Bond in Brick Work

From W. M. L., Orange, N. J.—Referring to the article on page 58 of the February issue of *The Building Age* contributed by "A. C. B. N.," of Toronto, Canada, in which he comments on my article relating to "E. G. H.'s" query in the issue for October last, I wish to say that I have seen isolated brick piers of buildings with 1½-in. closers at the corner of the piers. Speaking of this matter, it depends on conditions. Piers are not always built to support a load, and if not of unusual hight the appearance more than the bonding is taken into account, as, for instance, a short-hight brick pier faced with front brick; so long as the front brick is properly tied into the backing the closers of 1½ in. could be at a corner, and my sketches were based on this. It is probable that "A. C. B. N." is a draftsman, with a draftsman's mind, while mine is both practical and scientific. "A. C. B. N." has pictured a conception not of my intention.

The station of the D., L. & W. Railroad at Newark has 1½-in. closers at the corner angle of the brickwork supporting a load, but the sectional area of the pier itself is bonded properly. For his own good "A. C. B. N." might watch work in practice, as I have done, and keep details in mind, if he be of the younger class.

From a practical standpoint the comments of "A. C. B. N." as to corner construction are good.

Surfacing a Dance Hall Floor

From C. E. G., Boyne City, Mich.—I would recommend "W. N. A.," Comox, B. C., who asks on page 55 of the February issue about surfacing a dance hall floor, to use as much warm water as the floor will stand without danger of buckling it, and then when dry make a crack filler of common laundry soap and whiting or pulp plaster with wood fiber all screened from it; then scrape down, sand and wax.

Size of Cast Iron Column Required

From J. H., Chicago, Ill.—I am designing a seven-story warehouse and need a cast iron column, with a length of 12 ft. to carry a load of 165 tons. The results given in different reference books show such a great variance that I come to the correspondence columns for the information.

Answer.—In reply to the question raised by our correspondent, Ernest McCullough furnishes the following comment:

"Under the Chicago building ordinance, using the straight-line formula,

$$f = 10000 - 60 \frac{l}{r}$$

in which f = stress in lb. per sq. in.
l = length in inches
r = least radius of gyration in inches,

a cast iron column with an outside diameter of 11 in. and a thickness of metal of 1½ in., will carry 167 tons.

The New York building code uses the straight line formula,

$$f = 9000 - 40 \frac{l}{r}$$

and this shows that a column of the size above mentioned will carry 163.5 tons, which is close enough for all practical use.

$$\text{Load} = \frac{\text{Area}}{f}$$

The 1914 edition of the Carnegie Steel Company's Pocket Companion contains a table based on the present New York code. The 1903 edition of Carnegie contained tables based on the Gordon formula, which used the diameter instead of the least radius of gyration. From the old Carnegie Pocket Companion we find that a cast iron column of the length given, having a diameter of 11 in. and a shell thickness of 1¾ in. will carry 167.5 tons. The 1908 edition of Kidder contains a table said to have been computed from the same formula, and here we find that a column 11 in. in diameter with shell 1⅜ in. thick will carry 171 tons. While the tables were computed by using the same formula the Carnegie book used a factor of safety of 10, while Kidder used a factor of safety of 8.

The Rankine formula is generally used in textbooks and handbooks issued by correspondence schools, the least radius of gyration being given instead of the diameter, this being the sole difference between the old Gordon formula and its appearance as modified by Rankine. Using the Rankine formula a column 11 in. in diameter with shell 1⅜ in. thick will carry 141.5 tons.

The modern formulas used in Chicago and New York are the best to follow. They are based on tests on columns made of modern structural cast iron, which is a far superior article to that used in the tests on which Gordon and Rankine based their work. The Rankine formula is correct in form, but is cumbersome to use compared with modern straight line formulas, developed from experimental data. The old formulas gave the ultimate strength, which had to be divided by a number representing the factor of safety, to obtain the safe strength.

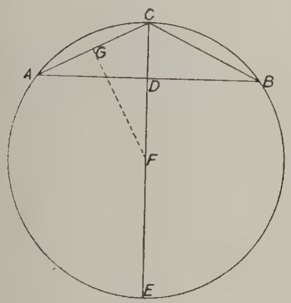


Fig. 1

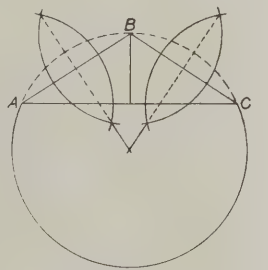


Fig. 2

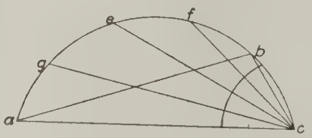


Fig. 3

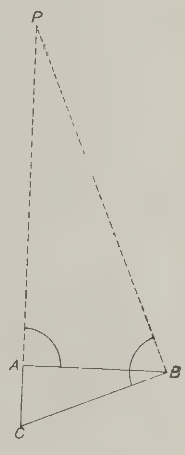


Fig. 4

Finding Radius of a Circle—Method Suggested by "D. P. B.," of Redford, N. Y.

Modern formulas use a safe fiber stress and the load obtained is the safe load, the factor of safety being a factor that is not considered in any other way than by assuming a safe fiber stress which is a certain fraction of the breaking stress.

Finding Radius of a Circle

From D. P. B., Redford, N. Y.—In answering the inquiry of "D. G.," Winnebago, Minn., I am sending two solutions, as both are practical. Referring to Fig. 1 of my diagrams the chord *A-B* is 12 in.; bisect this line and through the point of bisection draw *C-E* perpendicular to *A-B*. Now *C-D* is 3 in. and is the versed sine. The line *A-D* is the mean proportional between the two parts *C-D* and *D-E*, then

$$CD : AD :: AD : DE \text{ or}$$
$$3 : 6 :: 6 : x$$

and as $x = 12$, then $12 + 3 = 15$, which is the diameter. One-half of this is 7½ the radius.

Referring now to Fig. 2, bisecting both *A-B* and and *B-C* and erecting perpendiculars at the points bisecting them will meet in the center of a circle passing through these three points. The arcs show how the perpendiculars are erected with compasses.

Now, coming to Fig. 3 it may be seen how to locate a fourth, a fifth and a sixth point on a circle after drawing the circle through any three points. Take *a*, *b* and *c* as the points and connect them. Bisect the angle *a-c-b* and draw a line through this point to *e*. This is a fourth point and quadrisecting gives the points *f* and *g*.

Referring to Fig. 4 it may be seen how to apply the facts of Fig. 1. To calculate the distance from *A* to an inaccessible point as *P*, measure off a short base line to *B* at right angles to *A-P*. Repair to *B* still sighting at *P* and lay off a second right angle to *C*. The line *A-B* will become a mean proportional between *A-C* and *A-P*, thus

$$AC : AB :: AB : AP$$

Proper Fall of Skew-Back for Brick Arch

From W. M. W., Lancaster, Pa.—Having derived a vast amount of profit through the medium of *The Building Age*, principally through the information desired by others, I now turn to the readers for their opinions on a subject of personal interest and hope that others may be profited as I have been. The subject in question is that of brick arches of which many of our craft know but very little.

I have a book entitled "Practical Bricklaying," and among its many illustrations is one of a flat arch. The arch having a span of 3 ft. and a depth of 14 in. calls for a fall of skew-back of 3½ in. It will be seen in working this problem back to its origin that the rise is 2.21 in., or a little more than 1/17 of the span.

In consulting an architect as to his method of determining the rise of the arch he informs me that 1½ times the span should be taken as the radius. According to this plan the rise for an arch with the same dimensions as the one mentioned is 3.1 in. and the fall of skew-back 4.93 in., or practically 5 in.

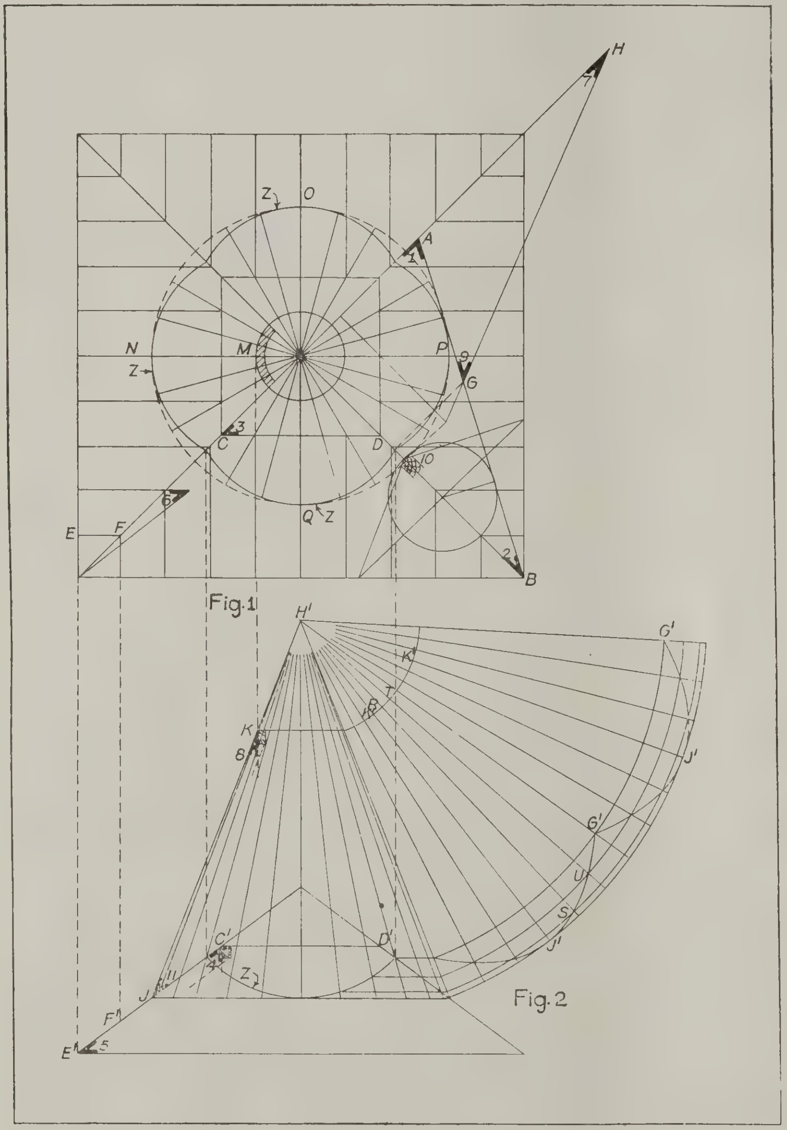
It will be seen in the latter case that the rise is nearly 1/12 of the span, while the skew-back has 1.43 in. more fall. The difference between 1/12 and 1/17 seems too great to consider both arches safe, but in building the arch I know which of the two I would prefer.

What I would like to know through the Correspondence Department is what the readers consider the proper fall of skew-back for the arch given in this particular illustration.

If an explanation of the method used in finding any of the above dimensions is likely to interest readers I shall be glad to explain the one I used, provided the interested one will make his wishes known through the columns of this paper.

Framing a Conical Roof

From E. H. B., Hampton Institute, Va.—I have noticed several replies to the inquiry of "J. W.," Victoria, B. C., who asked in a late issue how to frame a conical roof, but my method of doing the work is slightly different from those already published, and I trust it will, therefore, prove of interest to the correspondent in question. I would suggest that "J. W." allow the hips of the square roof to come together. The length of the hip rafter is shown at A-B of Fig. 1, the plumb cut at 1 and the foot cut at 2 then cut in the purlins between the hip rafters, the length of purlin being shown at C-D of Fig. 1 and at C′-D′ of Fig. 2. The cut against the hip rafter is shown at 3 of Fig. 1. This is a 45 degree cut, the purlins being set with the sides plumb.



Framing a Conical Roof—Sketches from "E. H. B."

Next cut in the common rafters against the purlins, the length being shown at C′-E′ of Fig. 2 and the plumb and foot cuts at 4 and 5. Next cut the jack rafters against the hip rafters, the cut against the hip rafter being shown at 6 of Fig. 1 and the length of jack E-F in Fig. 1 is shown at E′-F′ of Fig. 2. The plumb and foot cuts for the jacks are the same as for the common rafters.

Now sheath the hip roof up to the purlins which will give nailing support for the conical roof. In framing the roof set up four rafters with their centers on those of the hip rafters of the square roof. The length of these rafters is given at G-H of Fig. 1 and at G′-H′ of Fig. 2. The plumb cut is given at 7 and 8, these cuts being the same. The foot cut is shown at 9. The foot cut should be grooved with a V groove corresponding to the backing for a hip rafter, which is shown at 10 in Fig. 1. The hip rafter should be cut a trifle longer on account of this groove.

The next step is to cut in segmental shaped purlins between these four rafters as shown by the shaded segment M; then set up four rafters with their centers on the rafters N, O, P and Q. The length is shown at J-K and J′-K′, while the plumb and foot cuts are shown at 8 and 11.

We now have eight rafters set in place forming the conical roof. If these are not sufficient, depending, of course, on the size of the roof, others may be added. The plumb cut will be the same as the first ones. The lengths are shown at R-S and T-U. The foot cut will vary, but can be scribed on the sheathing, which should not be difficult, as the length is given. Other segmental purlins may be added to give better support for the covering.

The lines in the diagrams representing rafters indicate center lines taken on the center of the top edge of the rafters, those representing purlins indicate outside corner on top edge of purlins.

The solid line Z in both Figs. 1 and 2 represents the line of intersection of the conical with the hip roof.

Details for Inlaid Tables

From H. L. B., Columbia, S. C.—I wish to know if some of the readers will through the Correspondence columns furnish details for inlaid tables, either square or round, and state what color of wood should be used. If round, the table should be 2 or 3 ft. in diameter, or if square, it should measure approximately 28 x 42 in. I am disposed to think that this is a question which will interest other readers as well as myself.

Plans Wanted for January Cover Design

From M. E. M., Canton, Ohio.—I have been reading *The Building Age* for a number of years and I find it the best of all the many trade papers which I have taken. In my youth I read *Carpentry and Building*, to which my father subscribed.

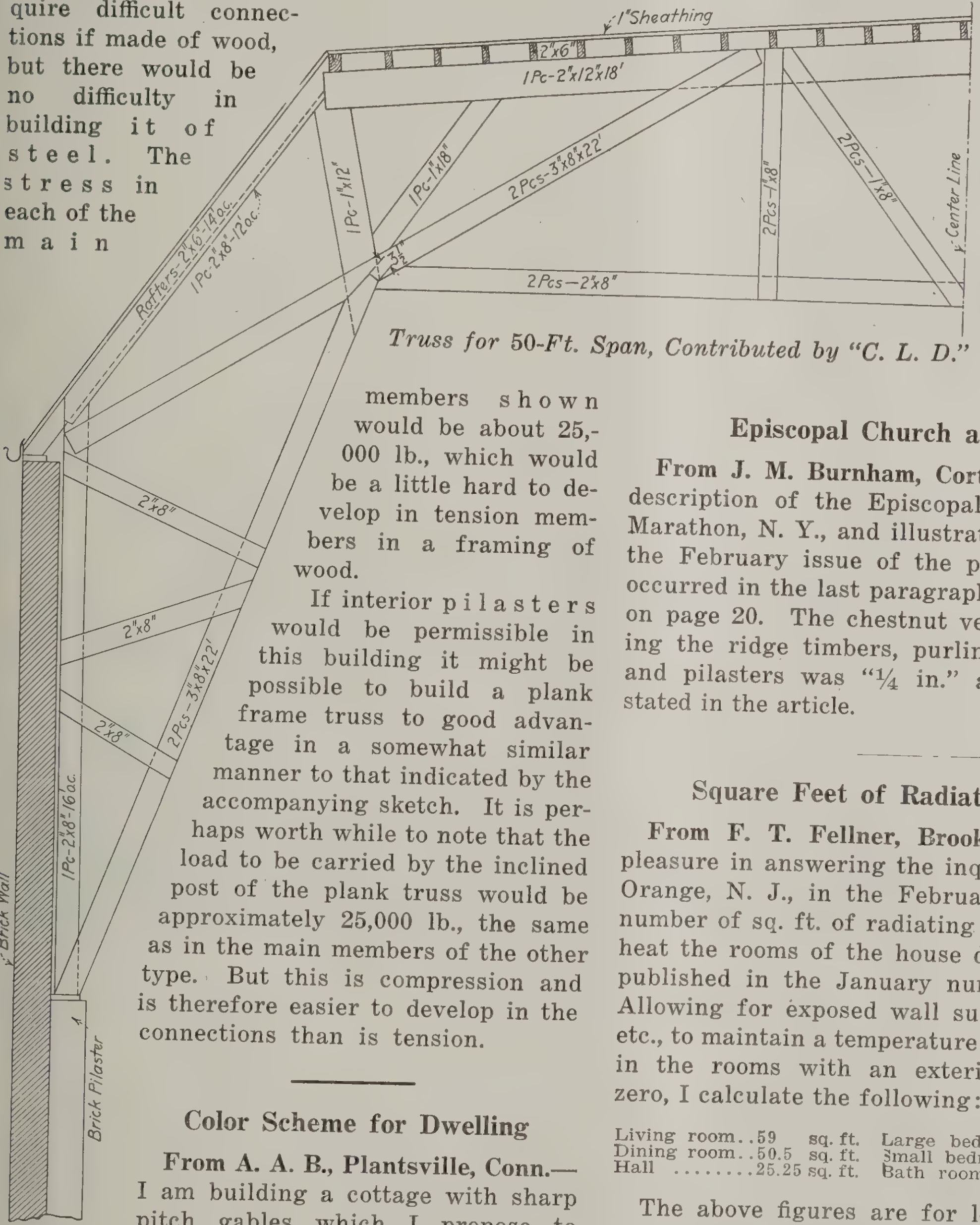
Would it be possible for Mr. Fellner to furnish the elevations and floor plans of the house shown on the cover of the January issue of *The Building Age?* I am interested in this kind of residence, and I rather like the one there shown.

I wish *The Building Age* a long and prosperous career in its endeavor to help the mechanic in his chosen trade.

Truss for 50-Foot Span

From C. L. D., Minneapolis, Minn.—The roof truss shown in the Correspondence columns of the December issue of *The Building Age,* page 584, looks to me as if structural steel would be the only safe material to use for this work. The shape of the truss is such as to require difficult connections if made of wood, but there would be no difficulty in building it of steel. The stress in each of the main members shown would be about 25,000 lb., which would be a little hard to develop in tension members in a framing of wood.

If interior pilasters would be permissible in this building it might be possible to build a plank frame truss to good advantage in a somewhat similar manner to that indicated by the accompanying sketch. It is perhaps worth while to note that the load to be carried by the inclined post of the plank truss would be approximately 25,000 lb., the same as in the main members of the other type. But this is compression and is therefore easier to develop in the connections than is tension.



Truss for 50-Ft. Span, Contributed by "C. L. D."

Color Scheme for Dwelling

From A. A. B., Plantsville, Conn.—I am building a cottage with sharp pitch gables which I propose to stucco from the bottom of the second story windows up to the peak, and below the stucco the exterior will be shingled. Now what color would it be advisable to stain the shingles to match the light gray stucco with timber finish, the timber finish to be either white or dark stain?

Answer.—While certain shades of blue, old rose and even weathered oak, will harmonize with your light gray stucco and wood trim, yet for the exterior of the cottage you will probably secure very satisfactory results by staining the shingles an olive-green in which the green predominates.

Construction of a Double Hoist and Tower

From T. W., Montreal, Canada.—I would like to know through the Correspondence columns of *The Building Age* the details, with working drawings, of a double hoist and tower such as is used on a 10-story building. I want the drawings of a double platform hoist with boom attached to one corner, the boom being used for hoisting lumber, while the platform hoist is for brick, mortar, plaster, etc.

I want to know the sizes of the timbers used, the quickest way to erect the hoist, the size and position of sheaves, and position of hoisting engine. A reply to this by practical builders who have had experience in this line of work will be greatly appreciated.

Episcopal Church at Marathon

From J. M. Burnham, Cortland, N. Y.—In the description of the Episcopal Church erected at Marathon, N. Y., and illustrated and described in the February issue of the paper, a slight error occurred in the last paragraph of the first column on page 20. The chestnut veneer used in covering the ridge timbers, purlins, principal rafters and pilasters was "¼ in." and not 1¼ in., as stated in the article.

Square Feet of Radiation Required

From F. T. Fellner, Brooklyn, N. Y.—I take pleasure in answering the inquiry of "W. M. L.," Orange, N. J., in the February issue, as to the number of sq. ft. of radiating surface required to heat the rooms of the house designed by me and published in the January number of the paper. Allowing for exposed wall surfaces, glass areas, etc., to maintain a temperature of 70 degrees Fahr. in the rooms with an exterior temperature of zero, I calculate the following:

Living room	59 sq. ft.	Large bedrooms	38 and 39 sq. ft.
Dining room	50.5 sq. ft.	Small bedrooms	33 and 34 sq. ft.
Hall	25.25 sq. ft.	Bath room	11.5 sq. ft.

The above figures are for low pressure steam and to compute the required area for hot water about 60 per cent. should be added to them.

Removing Stains from Lumber

From C. H., Milwaukee, Wis.—Can any one tell we what painters use for taking off water stains, dirt spots and the like from lumber before filling?

Calgary, Alta., is about erecting a theater building to cost half a million dollars.

Patent Roofings in Humid Climates

What a U. S. Consul Has to Say About Various Roofings in China; Their Cost and the Effect of Moisture on Them

IN spite of the strong prejudice against it on the part of Hongkong architects and builders and of the faults it has under certain features of Hongkong climate, there has been a notable increase in the use of prepared or patent felt and similar roofings in Hongkong, especially in the past six months or so. The roofing problem in Hongkong and in tropical cities subject to similar conditions of extreme heat and dampness, with some cool dry weather in the so-called winter months, is a serious one, says a recent consular report. In spite of unusual allowance for the roofing of structures in Hongkong, there are few, if any, buildings in the colony which are thoroughly waterproof, and leaking roofs are common in all classes of houses. The ordinary roofing is of Chinese tile, whose joints are set in cement. There are also a considerable number of reinforced concrete roofs and roofs also of imported tiling. All, however, give trouble.

Use of Prepared Roofings

The use of prepared roofing so far has shown comparatively little improvement over previous conditions. This has been due largely to the lack of proper workmanship in the laying of such roofing and also is due to the fact that most prepared roofing is not made with special regard to resisting the extremely hot and damp climate. Most prepared roofing used is of the felt sort, laid in tar or asphaltum, either on boards or upon reinforced concrete, the latter being the system favored at present. Such roofing seems to have the water-resisting elements steamed out of it in the course of a season. It is a notable fact that actual temperature changes do not affect such roofing so seriously as that in Hongkong is affected, for it has been found that roofing of this sort lasts longer in both Indo-China and the Philippines than it does in Hongkong. In all these countries, but particularly in Hongkong, it has been found that after roofing of this sort has been laid for a while it becomes brittle and can be torn apart without difficulty; the parts are easily shredded, the entire "life" being missing from the composition.

Effect of Moisture on Roofing

In Hongkong there has also been continual trouble in having such roofs put on under dry conditions, and it has been found that when any material amount of moisture is imprisoned by such roofing it leads to immediate decomposition, apparently by the formation of gas. The gravel used for covering the felt roofing and the sand used in laying it are almost invariably salt-water gravel and sand, and apparently this also affects the roof chemically and leads to decomposition. There has been trouble also in connecting the sides of the roofing with gutters and water vents. This, owing to the climate here, must be done with cement, and it has been found difficult to get the contractors and others interested to adapt old methods to the new construction. Most Hongkong roofs are flat or of comparatively slight fall, because of typhoon and storm conditions to be met. There has been some difficulty also in securing an effective grade of gravel, *i.e.*, sharp, uniform and hard. The cost of tar and asphalt is unduly high, all things considered. The usual cost of a Chinese tile roof is around 12 to 13 cents local currency (5.76 to 6.24 cents gold) per foot. The usual cost of patent roofing laid in asphalt is around 17 cents local currency (8.16 cents gold) per foot. The asphalt used is a preparation shipped in casks of 400 pounds, costing here about $7.68 gold per cask. A good roof of patent roofing in asphalt can be put on most structures in Hongkong for about $17 local currency, or about $8.16 gold, per square. For this from $19 to $21 local currency ($9.12 to $10.08 gold) can be obtained. A short time ago, before there was competition, from $23 to $25 local currency ($11 to $12 gold) could be had per square for the same roof. The matter of exchange must be considered in all these prices.

Material Advantages

As against all these disadvantages there are advantages which are very material. In the first place a composition of patent roof laid in asphalt on a concrete roof is the most permanent roof now made in Hongkong. While concrete is subject to cracks and other troubles due to contraction and expansion, such faults are corrected, to a great degree at least, by patent roofing. The tiling systems not only involve heavy expense for heavy timbers which must be replaced often, but also are actually ineffective against heavy rains and typhoon winds. That there is opportunity for the sale of such goods here is indicated by the growth of the business. It is becoming more and more evident that some change from the old type of tile roofing is necessary. At present patent roofing does not meet all local requirements, but it offers material improvement over past construction methods, and a composition roofing which will resist unfavorable conditions in this climate will unquestionably in time find a large sale. The roofing now imported is almost solely American.

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The United Brotherhood of Carpenters and Joiners of America has by referendum vote just decided to withdraw from the building trades department of the American Federation of Labor.

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There are about 37 pines native to the United States, 25 being Western species and 12 Eastern.

A Concrete Stable and Feed Mill

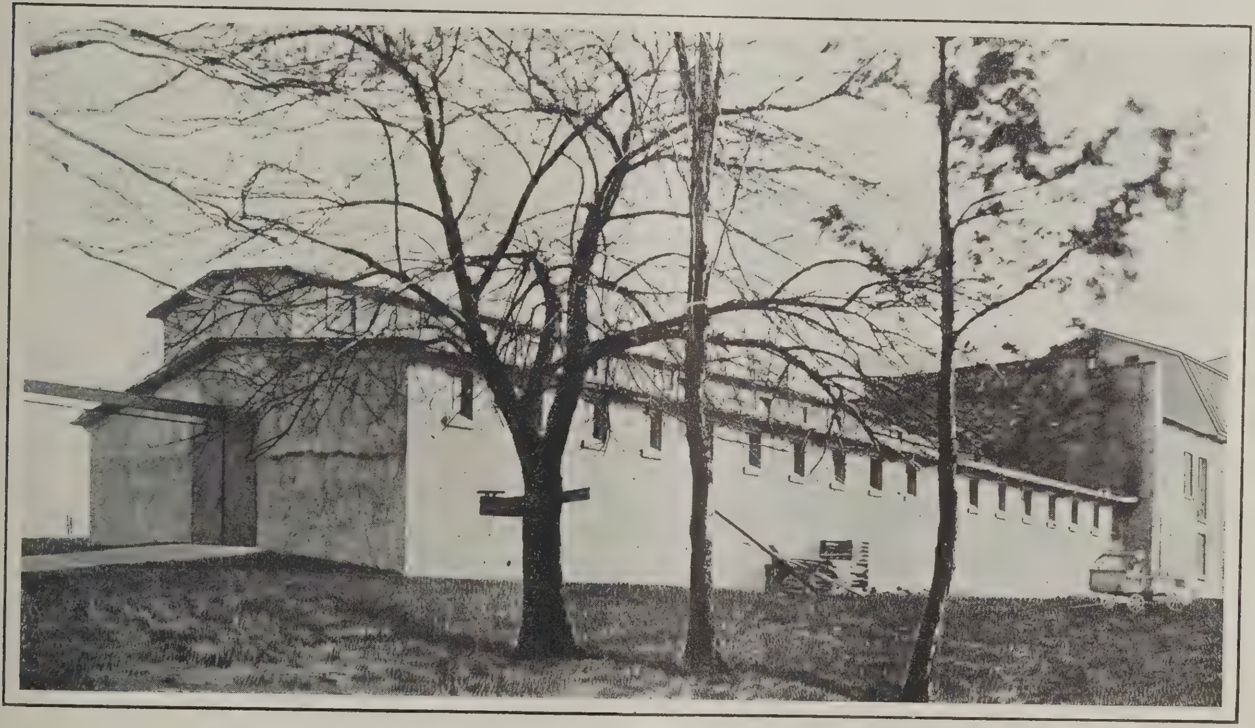
A Building Involving Unique Features—The Concrete Walls Are Double with an Insulating Air Space

A CONSTRUCTION which is somewhat out of the ordinary as regards the many details involved in its erection and equipment is the large concrete stable and feed mill or grain storehouse which constitutes the basis of the illustrations presented herewith. The structure covers a ground area 34 x 127 ft. and of this area the stable portion occupies 96 ft. of the length. In the half-tone engraving on this page is presented a view of the stable end of the building while beyond and at the extreme right is shown the two-story feed mill, a portion of the lower floor of which is occupied as an office. On the following page will be found the floor plans and also a cross-section of the feed mill. The stable is separated from the two-story building by a fire wall constructed of concrete.

On one side of the 12-ft. alley, which extends through the stable are 18 single stalls, while on the other side are 14 single and two box stalls. Each stall is lighted by a window 2 x 3 ft. in size. As the frames were not on hand when the work of construction was under way false frames were used to secure the desired opening, and then the permanent frames were substituted later. This made a little difference in the cost, for if available they could have been built in at first at somewhat less expense. The window sills are 4 in. thick and are made of hollow tile laid in mortar and covered with the same stucco coat which was used on the rest of the building. The side walls of the stable portion are 9 ft. in hight.

The feed mill and office structure shown at the extreme right in the half-tone engraving measures 28 x 34 ft., is 20 ft. in hight and constructed entirely of concrete and steel, the door frames and windows being of the latter material. An inspection of the main floor plan will show that the office section is separated from the stable beyond by means of a sliding fire door. A solid brick wall 13 in. thick, which forms the front end of the two-story section, serves the purpose of a fire wall between it and another stable which was erected a year ago. Fire doors are here used to connect the two buildings. This brick wall is joined to the concrete side walls at each corner by means of a dovetail joint—concrete and brick alternating; that is, a 9 1/3 in. course of concrete as laid by the Van Guilder hollow wall machines, and then 9 in. of brick.

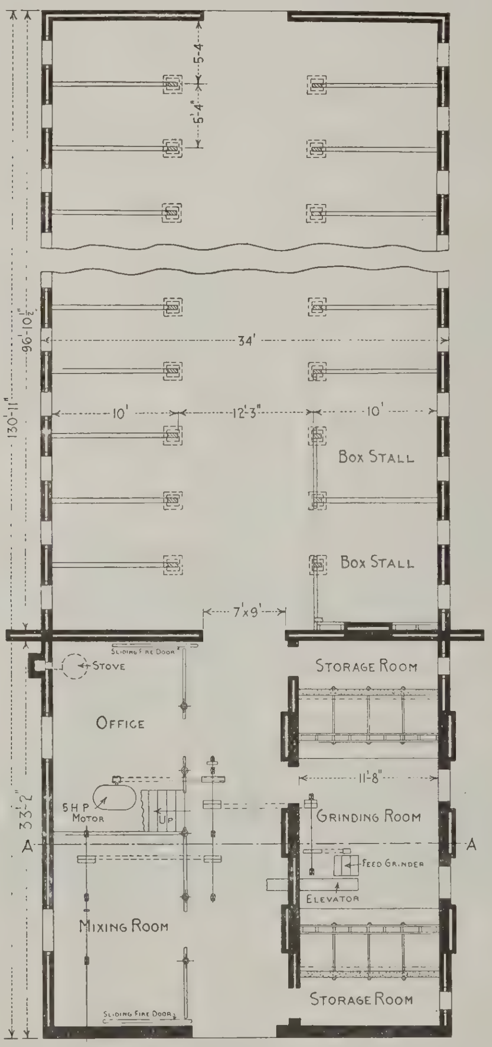
Two large storage bins are formed at one side of the feed mill by a concrete wall running parallel with the side wall, as shown on the floor plans, and 18 ft. in hight. The opposite side, which is 20 x 28 ft., is two stories in hight and contains office, grinding room, mixing room and alley; also a small storage bin on the second floor. Provision was made for heating the office by building flue linings into the side walls by means of the Van Guilder pilaster and chimney "form."



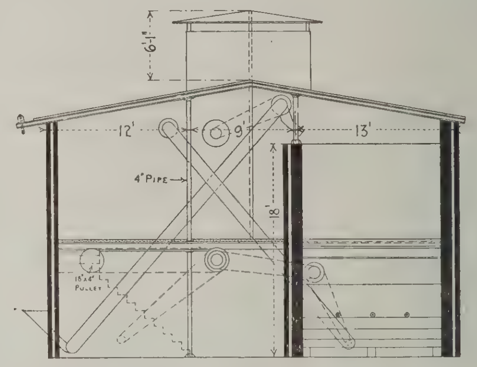
Photographic View of Concrete Stable Built at Union City, Pa., with Feed Mill and Office Shown at Extreme Right—Plans drawn by Engineering Department Merrell-Soule Co., Syracuse, N. Y.

Additional strength is secured in the walls of the bins by means of three pilasters 4 ft. long and projecting from the main wall on each side, the one at the end reaching from foundation to roof. Each pilaster is reinforced vertically by four ¾-in. twisted steel rods. These rods were spaced and stayed in position and the concrete built up around them 9 1/3 in. at a time.

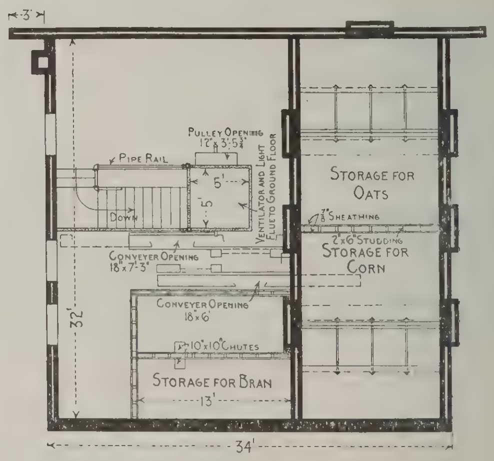
A 3-in. pipe filled with concrete placed in the center of each bin and reaching from one side wall to the other anchors the walls together and overcomes any tendency to spread when the bins are filled. Hoppers open from each bin into a central feed room about 6 ft. in hight. The sloping bottom of the bins—part of which forms the roof of the feed room—is constructed of heavy steel I-beams and channel iron securely bolted together and covered with "Ferroin-clave," made by the Brown Hoisting Machinery Co., Cleveland, Ohio, and this in turn is covered with 3 in. of concrete.



Plan of Main Floor.—Scale 1/16 In. to the Foot



Cross Section of Feed Mill at Line A-A of the Main Floor Plan.—Scale 1/16 In. to the Foot



Plan of Second Floor of Feed Mill.—Scale 1/16 In. to the Foot

A Concrete Stable and Feed Mill—Plans and Section

With the exception of the ground floor the roof and balance of the building are of this construction. The rafters of this portion of the structure are 7 in. steel I-beams embedded in the side walls, bolted together at the ridge, and each rafter supported at a point 12 ft. from the eaves by 4 in. iron posts filled with concrete and resting on the bin wall on one side and on the second floor on the other, the floor being supported by columns resting on pier foundations.

The rafters of the stable portion of the structure and also the skeleton work for the Monitor roof are of frame. Various details clearly indicating the construction are presented on another page.

The walls of the building were constructed with the Van Guilder hollow wall machines, made by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y., the construction consisting of two parallel walls 4 in. thick separated by 2½ in. air space, the whole being bound together by wall ties. The horizontal reinforcing consists of No. 9 galvanized wire placed in every 9 1/3-in. course as laid by the machines.

The stable and feed mill here shown was recently completed by the Merrell-Soule Company at their plant in Union City, Pa., and the plans were drawn by their engineering department at the home office of the company in Syracuse, N. Y. No contractor was employed, as the company did the work through its superintendent on the job, Mr. Kirkpatrick, but the hollow wall construction work was under the supervision of George Lewis, representing the Van Guilder Hollow Wall Company.

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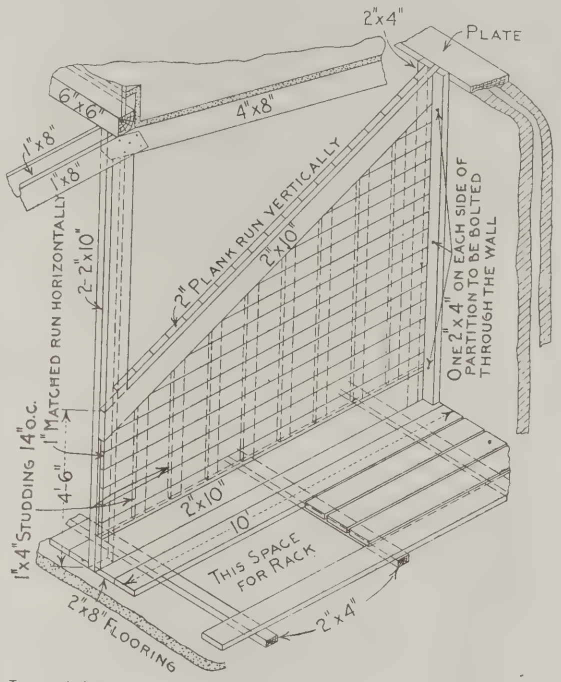
A carpenters union has just been organized at Pleasanton, Tex., with 35 members, of which number five are contractors. Considerable work is in prospect and builders are feeling much encouraged.

Need of Skilled Workmen in Building Trades

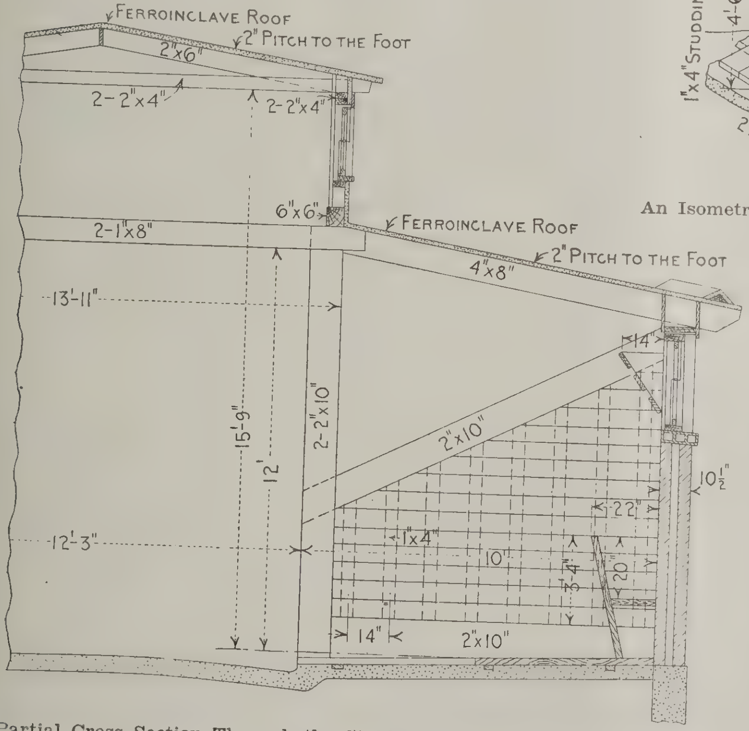
The American architect is handicapped almost fatally by the lack of good artificers to work out the detail of his plans, is the opinion held by Ralph Adam Crams, consulting architect of the Cathedral of St. John the Divine. The blame is placed largely upon our school system, which does not educate craftsmen and upon those labor unions that discourage the spirit of emulation. Mr. Cram's views are expressed in a paper which was read by him before the fourth annual convention of the American Federation of Arts. He tells of a member of the Committee of Education of the American Institute of Architects, who was asked to give a list of artist-craftsmen competent in design and execution and willing to work with due regard to the architectural environment of their products. His report was that there were two Americans who were doing well as beginners in stained glass but that it would be safer to go to England where the ancient tradition in design and workmanship still maintains in a measure. He named two good sculptors in wood—one a Bavarian and one a German—one admirable iron worker and two architectural sculptors.

"Nearly all our expert labor in the artistic trades," says Mr. Cram, "is imported from Europe. We pay large wages to foreign workmen but refuse to educate our own people so that this financial benefit may accrue to them. In other words our prosperity results in benefiting the alien, and we allow our citizens to degenerate, furnishing no new employment for the rising generation, but fitting it only to those limited callings which already are overstocked, and in which it can command but a minimum wage.

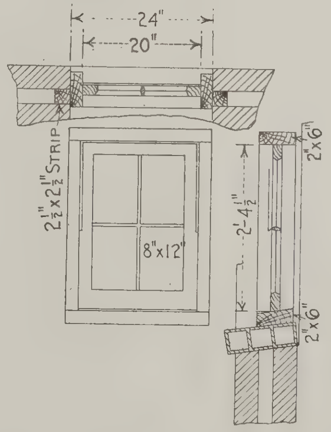
"Every architect knows that the success or failure of his work depends largely on the craftsmen who carry it out and complete it with all the decorative features of form and color, and yet in a nation of 100,000,000 people, with a dozen schools of architecture, practically nothing is done toward educating these same craftsmen, and we either secure the services of foreign-trained men, accept tenth-rate native work, or go without.



An Isometric Detail, Showing Some of the Features of Construction



Partial Cross Section Through the Stable.—Scale 3/16 In. to the Foot



Details of Stable Windows.—Scale ⅜ In. to the Foot

A Concrete Stable and Feed Mill—Miscellaneous Constructive Details

"Take a case in point; it is decided to build a metropolitan cathedral with little regard to cost; plans are made (we will say satisfactorily), what then? If it is to be a great and comprehensive work of art it needs (and exactly as much as it needs its architect) sculptors, painters, carvers in wood and stone, glass-makers, mosaicists, embroiderers, leather workers. Are there enough schools in America to train all the craftsmen needed on this one monument—if so, where?

"One of the foolish arguments against Gothic is that it is quite dependent on the artist-craftsman, and as we have none, we must abandon the style; one of the foolish arguments in favor of classical design is that anybody can learn to carve an acanthus, therefore we had better stick to what we know we can do. Neither argument is sound; if we have no artist-craftsmen then it would be better for us to close up half the schools that are turning out architects and employ the funds for the training of the only men who can give life to the architect's designs."

Mr. Cram says that in the good old days every bit of sculpture, painting, carving, metal work, joinery and glass and needle work, enhanced the architecture, glorified it and sometimes redeemed it as well.

"Now," he continues, "either our carving is butchered, our sculpture and painting conceived on lines that deny their architectural setting, our metal work turned out by the commercial ton, our stained-glass work defiant of every law of God, man or architect, or it is all reduced to a dead level of technical plausibility, without an atom of feeling or artistry—and we are glad to take it this way for the sake of escaping worse."

And all this, says Mr. Cram, is at a time when there are as many practicing architects in the directory of a great city as all Europe numbered during the whole epoch of mediævalism.

All the wealth and the artists and architects in the world, Mr. Cram says, could not rival to-day or equal the Capella Palatina in Palermo, which was merely the chapel of a second-rate prince in a frontier land in the dusk of the Dark Ages. The basic reason, he says, is the substitution during and after the Renaissance, in place of a communism that developed true personality, an individualism that destroyed personality. The triumphant individuality of the Renaissance, he says, hardened into an economic system that through mechanics, capitalism, and division of labor has become a very sordid kind of slavery.

There are, nevertheless, real craftsmen living today, Mr. Cram says, turning out exquisite work after the old fashion. "I know three makers of tiles and other products of burnt clay and glazes, who are consummate artists (one of them is a woman), and who are to be dealt with only as individuals, and who, if they are treated as allies, not as commercial purveyors of trade goods, can glorify any building with which they come in contact; I know two workers in wrought iron who are blood brothers of Adam Kraft, three goldsmiths who would gladden the heart of a Cellini, a woodcarver who is Peter Vischer restored to life, two sculptors who are really architectural sculptors as were the men who immortalized Chartres and Wells, a stonecutter whose craft matches that of the masons of Venice and Rouen, a maker of stained glass who needs only an opportunity to restore some measure of the wonder of this lost art, a maker of ecclesiastical vestments whose needlework is that of the fifteenth century, a scribe who can do real missals and other illuminations as these once were done long ago.

"And not one of them has really enough to keep him busy or return him more than a living wage, while by default thousands of dollars' worth of work they could do consummately goes weekly to factories and similar places where it becomes so much plausible sham."

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There are 16 maples in the United States, most of them being eastern species. The most valuable one is that of sugar maple.

Mammoth Contract in Sheet Metal Work

In connection with the erection of the new passenger station at Kansas City, Mo., an amount of sheet metal work was involved which rendered the contract decidedly out of the ordinary. In fact the contract was so large that it required the establishment of a completely equipped shop and office on the site. There were approximately 300,000 lb. of American ingot galvanized iron required, 13,000 lb. of copper for louvers and exhaust hoods and more than 50,000 lb. of angle irons for hangers and braces to support the galvanized ducts.

The station when finished will rank the third largest in the world, the main building and express offices alone with the train sheds being estimated to cost $5,500,000. The distance from east end of the mail house to west end of express building is 1800 ft. The grand lobby is 143 ft. wide, 120 ft. high and 272 ft. long. The general waiting room is 80 ft. wide, 80 ft. high and 400 ft. long.

In the construction of the station about 20,000 tons of steel are required, 250,000 sq. ft. of cut stone and fully $1,000,000 worth of concrete.

Comparing the capacity of the waiting room with other large railroad stations that at Kansas City with its 32,000 sq. ft. of floor space ranks second, the Pennsylvania Station in New York being first with 34,020 sq. ft. The Union Station at Washington, D. C., has 26,280 sq. ft.; the Grand Central Station 24,000 sq. ft. and St. Louis 18,000 sq. ft. In connection with the heating and ventilating system there will be required 120,000 sq. ft. of radiation, 20 miles of piping of which one mile will be a 20 in. steam line. Twenty-seven fans will be used to supply fresh air and exhaust the foul air.

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Some Changes in the Advertising Staff of *Building Age*

Mr. A. E. Warner has been appointed western manager of *Building Age,* with headquarters at Chicago, to take effect March 1, vice Mr. Harry de Joannis who has resigned to take charge of an Eastern publication. Mr. Warner's long experience well qualifies him for his new duties and we bespeak for him the same kindly consideration extended to his predecessors.

Mr. Frank Meyers will have charge of the entire eastern territory with headquarters in New York. Mr. John A. King will have charge of the western Pennsylvania territory with headquarters in New York City and Pittsburgh.

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Work has just been commenced on a 10-story apartment house having a frontage of 100 ft. on Broadway and 140 ft. on 151st street, the plans having been prepared by Mulliken & Moeller, Park avenue and 41st street, New York City. The façade will be of brick and terra cotta and the cost is placed at about $575,000. The owner has recently filed plans for an 11-story structure for the Northwest corner of Broadway and 150th street, the estimated cost of the improvement being placed by the architect at $600,000.

The Relation of Architect to Contractor

One of Largest Problems of Building Business Is Lack of Co-operation Between Architect and Contractor

By Charles A. Bowen*

THERE are many problems confronting the contractors and builders of the present day and while the methods and practices are largely improved from those of a few years ago, yet there are still in existence many of the problems which existed in the past decade which have been brought about by present day conditions.

Building is one of the unfortunate trades in which an inexpert person is pre-disposed to believe that he knows quite as much as the expert, and while it is a fact that he generally knows what he wants, what he may be entitled to under the contract is often an entirely different matter and in this condition often lies the opportunity for arguments. As has been stated in previous articles, poor plans and specifications frequently handed the contractor upon which to bid for his work is a large problem, as is likewise a lack of skilled labor. Even these might be overcome if there was not such a lack of co-operation between architects and contractors.

The Lack of Co-Operation

This, it seems to me, is the largest problem which confronts those who are engaged in the contracting and building business to-day. There is no reason why there should be such a lack of co-operation between the architect and the contractor, for the source of their business and its existence is absolutely the same. The architect must have the contractor and the contractor, in most cases, must have the architect, while the work of each parallels that of the other. They are constantly in contact and the problems which confront the one, usually, are the problems which confront the other, and yet for some reason there is a woeful lack of co-operation between the two.

The architect is apparently imbued with the idea that the contractor is going to get the best of him and the contractor, on the other hand, seems to be imbued with the idea that the architect is trying to "put one over" on him, and instead of being upon a friendly basis where they can work in the greatest harmony to the best interests of their clients they are apparently, more or less, at swords' points. Whether this is the result of some peculiar make-up in the nature of the two, one being an artist and the other a mechanic, whether it is due to a lack of education along lines of compatability, or whether it is due to the condition of the time in which we live, it is nevertheless a most deplorable fact that this lack of co-operation exists.

There is, of course, unfair competition among and between architects as well as unfair competition among and between contractors, which is a great drawback to both of these important lines of a business which is one of the foremost of our modern times, and there is a large amount of unfair criticism by the general public against both contractor and architect which is entirely superficial and without foundation or sense. Yet it is thought by some of both profession and craft that a closer affiliation with each other would only strengthen in the minds of the public, the basis of this unfair criticism, that there was a collusion between them.

An Absurd Proposition

How absolutely absurd such a proposition or thought is may be seen in almost every building project, where this very lack of co-operation is shown by the troubles which arise, the disputes which have to be settled, the changes in specifications which have to be made, the large amount of "extras" which are necessary and for which the owner is held up on the work and which makes the cost more than originally intended or estimated.

Would it not be better to set aside public opinion, which is as variable as the wind, and have closer affiliation between architect and contractor, so that these troubles and abuses might be overcome through conference and friendliness and the exchange of ideas and thoughts, and thus prove in a few short months that it was a most beneficial association in that better and more complete plans and specifications would be made, more understandable and equitable contracts drawn, better building done and at a lesser cost, and with less worry to the owner who is paying the bills, the architect who has drawn the plans and made the specifications and the contractor who is executing the work. I contend that it would, and I also contend that men brought in contact with each other in such a manner are more fair, more honest, more sincere and more considerate of each other, and that they do not stoop to underhanded methods or illegal or unfair combinations and collusions—in other words are honest business men at peace with each other and the world.

Close Sympathy Between Architect and Builder

This is a day of co-operation; it is bringing about better results in every line of business and increasing individual efficiency. In a business of such importance as the building industry the closest sympathy and co-operation should exist between architect and contractor, who are both in the employ of the owner, to bring about the best results, not only for that owner who is pre-eminently entitled to it because he is paying for it, but for the benefit of the general public, the stability and beauty of our cities and villages and the general prosperity and solidity of our country.

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*Secretary Detroit Builders and Traders' Exchange.

Co-operation between the architect and contractor, the artist and the mechanic, whose combined efforts give us our habitations and business buildings, would bring about more complete plans and specifications, better contracts, better working conditions, better workmen and more of them, because of these conditions, do away with many disputes, reduce the cost of building somewhat and make for harmony all along the line. We are working for such co-operation and to bring about such conditions, and are gaining to some extent, but there is still a woeful lack of desire on the part of many which we hope to sooner or later overcome through individual and association work and to which I believe we should devote a large share of our energies.

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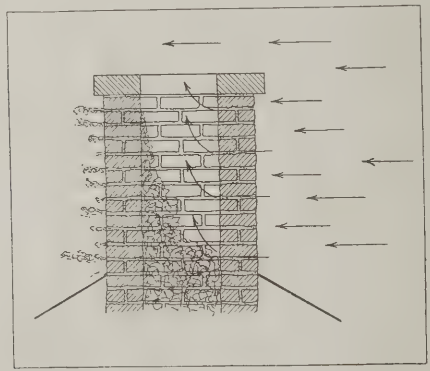
Importance of Good Chimney Construction

Many of the chimneys with which heating apparatus are connected are apparently as good as any other chimney to the unsophisticated, but to the expert they are poor chimneys indeed. In the mild weather of early fall almost any kind of a chimney will carry away the products of combustion from a fire of sufficient intensity to warm the air, circulate the water or generate the steam required to keep a residence, church or hall at a comfortable temperature.



Importance of Good Chimney Construction—Effect of Wind Pressure on Chimney Draft

When severe weather comes and a chimney must carry away the products of combustion from twice as much fuel as was burned earlier in the season the lack of draft becomes apparent and the heater fails to do the work which is required of it. The owner seldom knows anything beyond the fact that he suffers from cold and that the heater is not doing what it ought to do. He does not follow along to find out the cause, but complains to the man who sold him the heater and insinuates that he has been misled and that the heating apparatus he bought is entirely too small.

When it is explained that the chimney is doing as well as it can with a sore throat or faulty flue, the heating contractor is told that he is shirking his responsibility. In many cases it is necessary to resort to a great deal of persuasion to get the owner to realize that the mortar in the chimney has been eaten away by the gases, leaving the bricks with little to hold them in place or to prevent air from entering the chimney from the outside. He does not seem to understand even when told that instead of drawing the smoke away from the fire the chimney draws air in through all of these cracks and kills the draft that a chimney of its dimensions and height should have.

The middle of the winter is a poor time to rebuild a chimney, and a poor chimney will prevent the satisfactory operation of any heating apparatus, whether it be one of the best that could be devised or a competition job for a building contractor. Many very fine people who have good chimneys and good heaters complain of insufficient heat and investigation will demonstrate that the fire is being run at about the same rate in the middle of the winter, as it was in the early fall and there will be ashes to fill up more than half of the firepot and only a little fire on the top.

When the expert makes a visit and rakes out all of the ashes he has to be a little bit careful or he will not leave a sufficient amount of live coals in the fire chamber to start a good charge of fuel, and it may take him an hour or two to get the right kind of a fire going. Then instead of being thanked for his courtesy in showing what was wrong and how to right it, he is likely to be told that the family cannot afford to have him come up every time the house gets cold to build up a fire, nor can it afford to waste fuel as he has done to get a good fire in the heater when two or three shovels full ought to be enough.

However, when a good fire is going in the apparatus and the house is warmed up, there is the answer in the fact that the heater will do the business if the family will attend to the fire and put on the coal. Sometimes it might be well to advise the purchase of a decent poker or slicing bar, or a shaker for the grate and to provide a furnace scoop instead of a fire shovel to feed the fire with the fuel which it requires.

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Architect's Right to Mechanic's Lien

An architect is entitled to enforce a mechanic's line for compensation due him for preparing plans for a building and for superintending the construction, but not for merely preparing plans, according to a late opinion of the Appellate Division of the New York Supreme Court in the case of Spannahke vs. Mountain Construction Co., 144 New York Supplement 968. Citing a New York precedent, the Supreme Court said: "In that case the architect had drawn plans for a large building of which, however, only one-half had been erected under his superintendence. He was allowed a lien, in addition to his fees for superintendence, for one-half of the value of the plans which he had prepared for the whole building; the court remarking that an architect cannot have a lien for making plans alone, but when he makes the plans and supervises the construction 'it is the part that the architect takes during the construction that draws his services within the lien law.' "

It was further decided in the Spannahke case that plaintiff, having prepared plans for and superintended the construction of several houses under a single contract, properly filed a single lien for his services, not being required to file a separate lien for each building.

House Built by Carpentry Apprentices

Example of Work Executed by Students of the Bridgeport Trade School—A Few Details of Construction

By James F. Johnson, Director

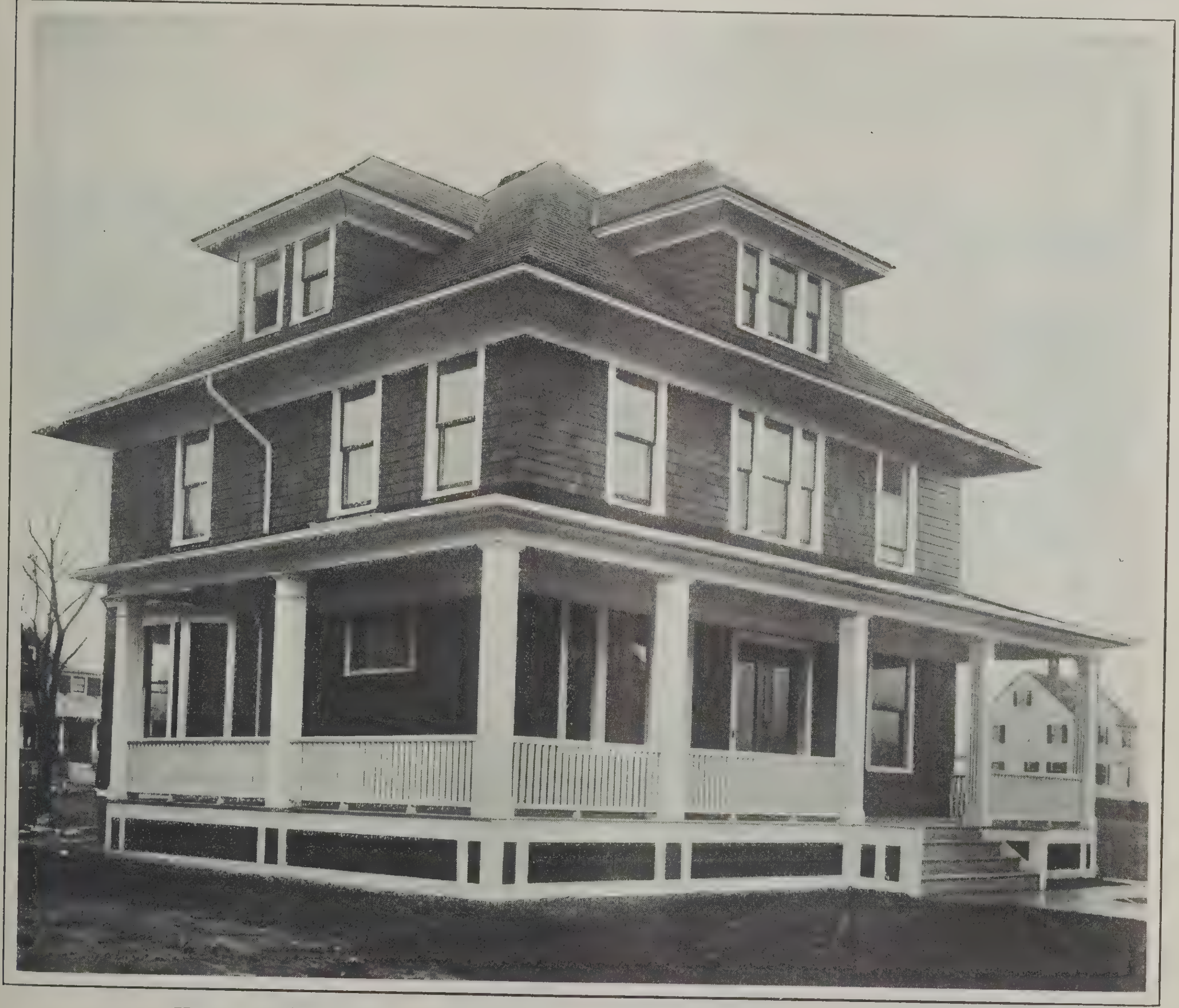
BY its radical departure toward real practical teaching methods in house-building the Carpentry Department of the State Trade School at Bridgeport, Conn., has of late attracted considerable attention from the carpenters and builders throughout the country. To bring before the readers of *The Building Age* the importance of a correct apprentice training for the coming tradesmen, and the great results that are attained in this direction by a State-controlled trade school where the students are taught the house-building trade by actually erecting livable houses, the accompanying pictures with descriptive particulars are given.

The house shown in the picture upon this page was finished a few months ago, and is now occupied by a family which seems proud of the fact that it is living in the best-built house in the vicinity. It has been inspected from cellar to attic by builders and contractors—union and otherwise—and has been pronounced a most creditable building.

The young apprentices who worked on this job are now engaged in the carpentry trade, earning from $2.25 to $3.00 per day, and their employers say that they are well worth their scale. When at work on the building here illustrated they ranged from 15 to 18 years of age.

However, such an advance could not have been made had it not been for the fact that the trade school used a most practical means of instruction.

Like the other trade school house illustrated and described in *The Building Age* for January, this one is entirely a trade school product. As the pic-



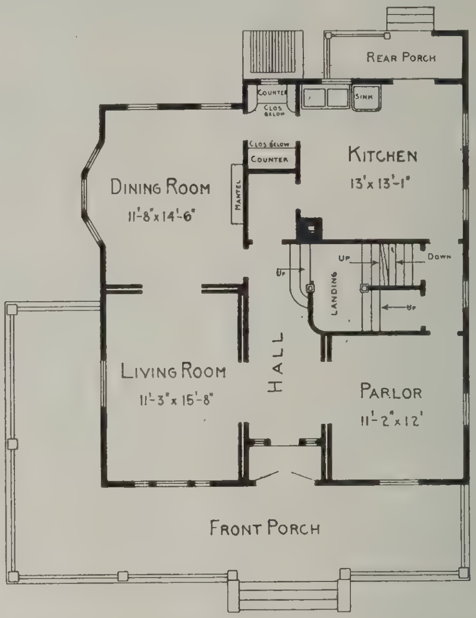
House Built by the Carpentry Apprentices of the Bridgeport Trade School tures show, the outside appearance is indicative of a neat and attractive design, well balanced and pleasing. The large veranda extending across the front and partly around the side, the overhanging cornice and well-chosen color scheme, bear all the marks of a much more skilled craftsman than one would ordinarily think came from a trade school. A well-known builder of the city, upon being asked how it compared with his houses, answered that it would be like comparing a carpenter's job to that of a cabinet-maker's, so well did it please him.

The house is intended for a single family. There are nine rooms, counting four, with large hall and vestibule on the first floor, and four bed rooms with linen closets and bath room on the second floor. In addition, there is a bedroom in the attic.

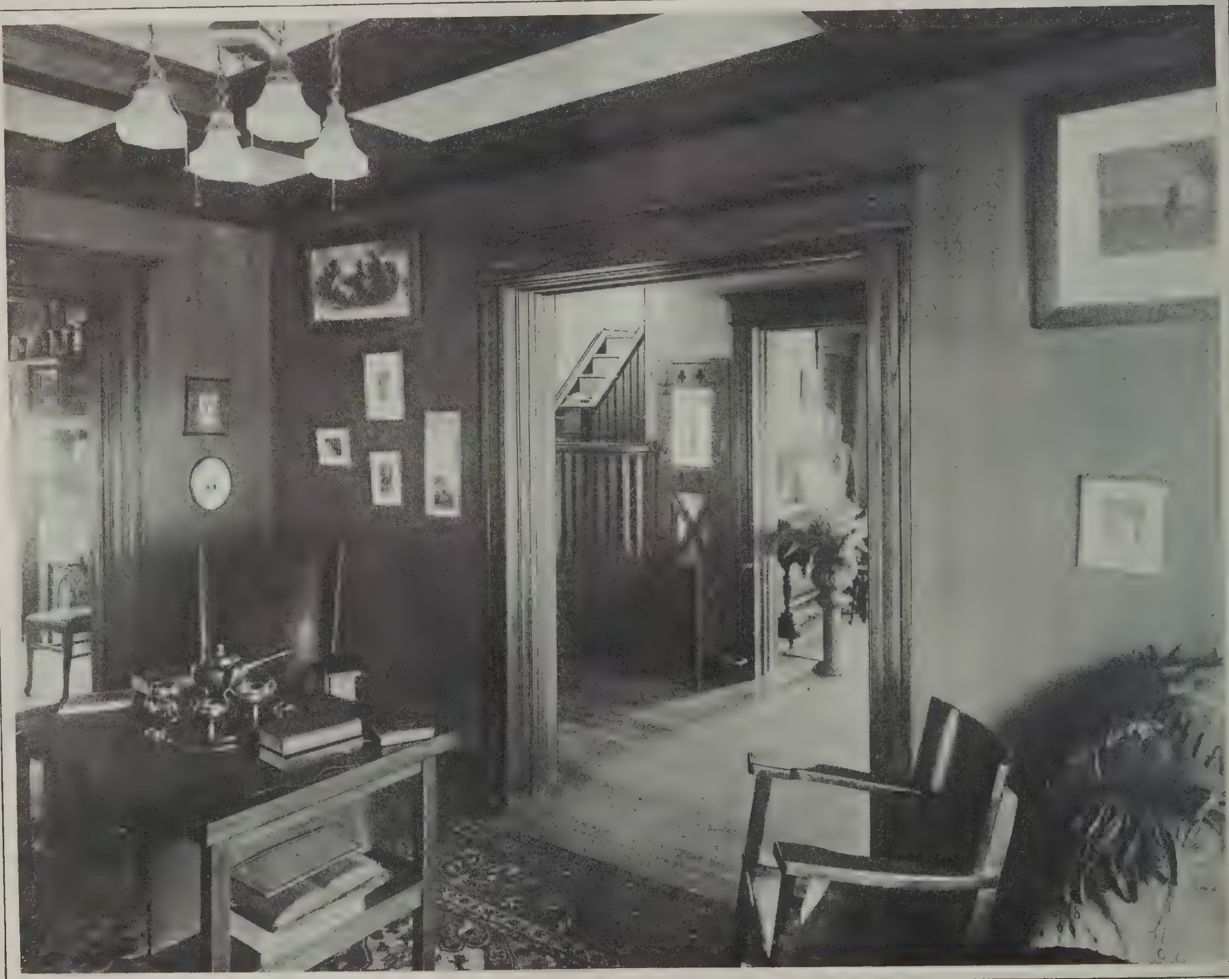
The roof is hipped on three sides with dormer windows. Cedar shingles, placed 5 in. to the weather, are used on the roof, while on the sides they are placed 5½ in. to the weather.

The porch floor is built of 1⅛-in. Oregon pine, and the columns are of the fluted style. These latter, with the stairway, were built in the Trade School Shops while the house was being plastered.

In the kitchen the floor is of North Carolina pine and the wainscoting runs to a hight of 4 ft.



First Floor Plan—Scale 1/16 In. to the Foot



View in Living Room Looking into the Dining Room at the Left and Across the Stair Hall into the Parlor at the Right
House Built by the Carpentry Apprentices of the Bridgeport Trade School

On the first floor the hallway, parlor, living room and dining room floors are quartered white oak. The trim in these rooms is of chestnut. The living room has a beam ceiling, also a quartered oak mantle. The pantries are fitted with closed cupboards having sliding glass doors in the upper section.

On the main floor all doors are of white birch cross paneled, with brass hardware and glass knobs.

The stairway is of white ash, the square balusters being dovetailed into the treads, while the risers and treads are tongued and grooved together.

In the rooms above, the floors are of North Carolina pine and the trim is of poplar finished in white enamel. All bed rooms have large closets, the closet door in the guest chamber having a full length mirror. The bath room is finished in white enamel with built-in medicine closet.

Regarding the frame work, which is built on an 18-in. foundation, the girders are of 6-in. x 8-in. Georgia pine, with 4-in. x 6-in. sills. The corner posts are of spruce, measuring 4 in. x 6 in., while the joists are of the same material, placed 16 in. on the center and the studding in the side walls and partitions are of 2-in. x 4-in. spruce.

The exterior of the house is finished in green with white trimmings.

While the undertaking of this project was by no means a trifle, it surely is a pleasure to review the good it has done the young apprentices who worked on it. Great credit is due the foreman of the carpentry department, for his previous experience in handling apprentice builders and his true appreciation of the problem and the worth of its proper solution were of greatest value.

The criticisms that were caused by the trade school undertaking this means of instructing its apprentices, and which at first were not at all encouraging, entirely disappeared. The apprentices have proven that the men are only boys older grown, and that the great need for intelligent tradesmen can be well supplied through sources similar to that here described.

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San Francisco Building Material Market

The building material market in San Francisco was about at a standstill during the stormy period of January, but is now beginning to pick up, with general anticipations of activity during the coming season. Dealers handling miscellaneous lines of materials report the receipt of numerous large orders and an increasing volume of inquiry, but do not expect to begin large deliveries before April, says our correspondent under date of February 6.

How much of the recent depression in prices for various lines of steel and hardware has been due to conditions in the East, and how much to foreign offerings in this market, is not yet well known, and until it is, buyers will be rather conservative in placing orders in the East. Many expect an increasing import movement as the Eastern market advances from the present low levels. At the moment domestic and foreign prices are too nearly on a par to encourage much importing, though a heavy tonnage of bars and a moderate quantity of structural steel are in transit from Europe. Local manufacturers of reinforcing bars have been able to keep going, though at materially reduced prices. There has been some figuring as to importing nails, but with little advantage in prices and an altogether different standard of lengths and gauges in the European material the idea is not regarded with favor.

The lumber market is stiffening up a little, especially on California redwood, which is $2 to $3 per M. higher than in December. Common redwood, which was a drug on the local market last fall, is now almost as firm as clears, and the latter are receiving much more attention from foreign and Eastern, as well as local buyers. Oregon fir, though not quotably higher, is due to advance at any time, as coastwise freight rates have gone up 50c. per M., and the demand is increasing. The Northern mills, however, are resuming operations on a large scale, and production may easily outrun the demand.

Common brick prices are not expected to be as high as last year, being now at $6.50, though an unusually large business has already been done for spring and summer delivery. The larger manufacturers are confident of disposing of their entire 1914 output, as well as a considerable holdover from 1913. Production at present is curtailed by weather conditions, and some plants built after the fire of 1906 have recently been dismantled, but a number of "soft-mud" plants will probably start up again in April.

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Master Plasterers Elect Officers

The Master Plasterers' Association of San Francisco held its annual meeting Jan. 20, electing the following officers: President, A. Knowles; vice-president, J. J. Connolly; secretary, Martin Lyden; treasurer, Peter Bradley; sergeant-at-arms, Joseph Kaiser. A new agreement with the journeymen plasterers was approved, providing for the arbitration of disputes. Reports indicated much plastering work in prospect.

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Banquet on 300-Foot Tower

The completion of steel work on the 300-ft. Sather Campanile at the University of California, Berkeley, Cal., was celebrated by the California Construction Company, steel erectors, by a banquet to its employees in the open framework of the top story. Owing to wind and rain on the announced date, the affair was delayed a fortnight, but was carried out about the end of January.

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Pioneer Sacramento Contractor Dies

Charles Sexton, for 43 years a well-known carpenter and contractor of Sacramento, Cal., died January 18, at the age of 83. Mr. Sexton crossed the plains from Illinois in 1850, and for a time engaged in mining, later running a hotel at Michigan Bar. Going to Sacramento in 1870 he started as a carpenter, and until ten years ago engaged in the building business. He had charge of the construction of the dome on the State Capitol Building in Sacramento, and himself placed the ball which tops it.

At a recent reunion, Mr. Sexton gathered about him five daughters and three sons, fifteen grandchildren and eleven great grandchildren.

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At the annual meeting of the Master Builders Association of Poughkeepsie, N. Y., held in Columbus Institute, the following officers were elected for the ensuing year: President, P. A. Peterson; first vice-president, William Degenhardt; second vice-president, Lawrence Wolf; recording secretary, Joseph Keating; financial secretary, Lewis T. Davis; and treasurer, Eugene Shover. After the business meeting the members enjoyed a smoker and a pleasant evening.

The Annual Cement Show in Chicago

A Most Successful Gathering of Those Interested in Cement-Concrete and Its Manifold Applications

REPRESENTATIVES of one hundred and thirty-five organizations interested in cement in one form or another greeted large crowds throughout the nine-day session of the Seventh Annual Cement Show, held in the Coliseum, at Chicago, February 12 to 21, inclusive.

In this and former expositions the exhibits have been truly representative of the important improvements in modern appliances used in the production and application of cement-concrete. The seventh annual meeting contained many new features as to design and principles of construction and the success of the enterprise was made possible by hearty co-operation of exhibitors.

Two Very Popular Exhibits

Aside from the commercial features of the exhibition two of the most popular displays were those of the Universal Portland Cement Co. and the Lehigh Portland Cement Co.

The "Universal Graveyard" featured one of the many exhibits of the Universal Portland Cement Co. Artistic concrete headstones bore touching momentos of late departed cement sacks. The headstones supplied comic descriptions of the ailment, the sack itself showing the results of mistreatment. Among the epitaphs was the following: "Stabbed—to the heart by a murderous workman who took by force what he might have obtained peacefully." The sack was shown ripped open at the side in order to get the cement out more easily and quickly.

The Lehigh exhibit comprised a model town in concrete with dimensions of 40 x 15 ft. In front of a panoramic background showing typical countryside was to be seen a model plant engaged in the manufacture of Portland cement, with suburban residences, farm houses, farm buildings and railroad stations, all of concrete. On one side was an electrically-operated railroad running over concrete bridges, viaducts and culverts, to an unloading plant where a steamer was to be filled with the product. The entire exhibit operated automatically.

Special Features of Interest to Contractors

Other important features appealing to contractors from a commercial standpoint consisted chiefly of concrete mixers, woodworking machinery, stone crushers, concrete molds, builders' derricks, and numerous inventions for facilitating the successful handling of concrete in its various forms. These booths were fitted most advantageously, and attractive literature was distributed freely and explanations forthcoming from home and branch office executives in charge of the exhibits.

During the exposition several important conventions were held, noticeably the Illinois Lumber and Builders' Supply Dealers' Association, the National Conference on Concrete Road Building, American Concrete Institute, Interstate Cement Tile Manufacturers' Association, and the National Builders' Supply Association.

A Few of the Exhibitors

American Cement Machine Co., Keokuk, Ia.
American Concrete Form Co., New York City.
American Saw Mill Machinery Co., Hackettstown, N. J.
American 3-Way Prism Co., Chicago.
Anchor Concrete Stone Co., Rock Rapids, Iowa.
Architectural Mold Co., Detroit, Mich.
Arrowsmith Concrete Tool Co., Arrowsmith, Ill.
Badger Concrete Mixer Co., Milwaukee, Wis.
Baute Cement Machinery Co., Benton Harbor, Mich.
Blaw Steel Construction Co., Pittsburgh, Pa.
Blystone Manufacturing Co., Cambridge Springs, Pa.
C. H. & E. Mfg. Co., Milwaukee, Wis.
Cement Machinery Co., Jackson, Mich.
Cement Tile Machinery Co., Waterloo, Iowa.
Ceresit Waterproofing Co., Chicago.
Chain Belt Co., Milwaukee, Wis.
Chicago Builders Specialties Co., Chicago.
Clover Leaf Machine Co., South Bend, Ind.
Concrete Supply Co., Arrowsmith, Ill.
Corrugated Bar Co., Buffalo, N. Y.
D. & A. Post Mold Co., Three Rivers, Mich.
Davis Acetylene Co., Elkhart, Ind.
Decorators Supply Co., Chicago.
Dunn, W. E., Manufacturing Co., The, Chicago.
Elite Manufacturing Co., Ashland, Ohio.
Eureka Machine Co., Lansing, Mich.
Foote Concrete Machinery Co., Chicago.
Foote, J. B., Foundry Co., Frederickstown, Ohio.
Garden City Sand Co., Chicago.
Hall Holmes Mfg. Co., Jackson, Mich.
Handy Sack Baler Co., Cedar Rapids, Ia.
Hercules Cement Vault Co., Chicago.
Hobbs Concrete Machinery Co., Detroit, Mich.
Huron Portland Cement Co., Detroit, Mich.
Hurst Silo Co., Chicago.
Ideal Concrete Machinery Co., Cincinnati, Ohio.
Interlocking Cement Stave Silo Co., Des Moines, Iowa.
Kant Machine Co., The, Kent, Ohio.
Kramer Automatic Tamper Co., Peoria, Ill.
Lansing Company, Lansing, Mich.
Lehigh Portland Cement Co., Allentown, Pa.
Louden Machinery Co., Fairfield, Iowa.
Marble Mosaic Co., Milwaukee, Wis.
Michigan Portland Cement Co., Chelsea, Mich.
Miles Mfg. Co., Jackson, Mich.
Milwaukee Concrete Mixer Co., Milwaukee, Wis.
Milwaukee Post Mold Co., Milwaukee, Wis.
Multiplex Concrete Machinery Co., Elmore, Ohio.
New Enterprise Concrete Machinery Co., Chicago.
Norwalk Mold Co., Norwalk, Ohio.
Ohio Post Mold Co., Toledo, Ohio.
Original Gas Engine Co., Lansing, Mich.
Oshkosh Mfg. Co., Milwaukee, Wis.
Peerless Brick Machine Co., Minneapolis.
Plastic Products Co., St. Louis, Mo.
Pull Easy Mfg. Co., Waukesha, Wis.
Raber & Lang Mfg. Co., Kendallville, Ind.
Sauerman Brothers, Chicago.
Sasgen Brothers Derrick Co., Chicago.
Sandusky Portland Cement Co., Sandusky, Ohio
Schaefer Mfg. Co., Berlin, Wis.
Simpson Cement Mold Co., Columbus, Ohio.
Standard Scale & Supply Co., Chicago.
Standard Tool & Mfg. Co., Indianapolis, Ind.
Staple Post Mold Co., Westerville, Ohio.
Peerless Portland Cement Co., Union City, Mich.
Peninsular Portland Cement Co., Jackson, Mich.
Trussed Concrete Steel Co., Detroit, Mich.
20th Century Mfg. Co., Chicago Heights, Ill.
Universal Crusher Co., Cedar Rapids, Iowa.
Universal Form Clamp Co., Chicago.
Universal Portland Cement Co., Chicago-Pittsburgh.
United Wire Tie Co., Toledo, Ohio.
Van Duzen, Roys & Co., Columbus, Ohio.
Van Guilder Hollow Wall Co., Rochester, N. Y.
Wabash Portland Cement Co., Detroit, Mich.
Waterloo Cement Machinery Corp., Waterloo, Iowa.
Wert, C. S., Kendallville, Ind.
Williams Patent Crusher & Pulverizer Co., Chicago.
Wolverine Portland Cement Co., Coldwater, Mich.
Wyandotte Portland Cement Co., Union City, Mich.
Yaeger Machine Co., Columbus, Ohio.
Zeiser Brothers, Berwick, Pa.

Sheet Metal for Interior Decoration

Growing Popularity of Metal Ceilings and Side Walls—Unlimited Designs Available—Fire-Resisting Qualities

IT is now something more than half a century since sheet metal, except as a roof covering, began to be used to any extent in connection with building construction, and during this period the industry has developed enormously until to-day it is one of the most important in the country. At first sheet metal was associated altogether with the outside work of buildings, such as cornices, gutters, leader pipe, store fronts, etc., but as time went on its merits for interior decoration became more and more recognized and now for ceilings and side walls in private dwellings, churches, banking institutions, school rooms, public buildings, etc., it is utilized to a remarkable degree. The nature of the material is such as to readily lend itself to ornate effects and therefore the variety of the designs which may be produced is almost legion. Some of the claims made for the steel ceiling are that it is durable, is easily applied and in the long run is more economical than lath and plaster. When once erected and tastefully decorated the metal ceiling and side wall require little or no attention except now and then to give them an application of soap and water to restore them to their original brilliancy.

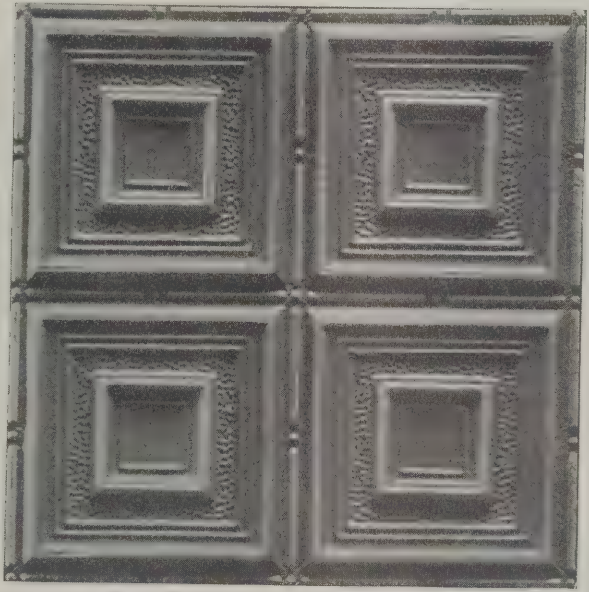


Fig. 1—Metal Ceiling Plate in the French Renaissance Style of Architecture

Another strong argument in their favor is that they are fire-resisting and tend to prevent the spread of the flames beyond the room in which the fire may have started. The deadening of sound and insulation of ceilings to prevent the radiation of heat or cold may readily be accomplished by the use of any good deadening or insulating felt, the process being to nail the insulating material into place before putting on the ceiling. In rooms where moisture is present and where ordinary metal ceiling might be susceptible to rust, the difficulty has been overcome by the use of galvanized or copper plated steel ceilings which is one of the more recent advances in the manufacture of this product.

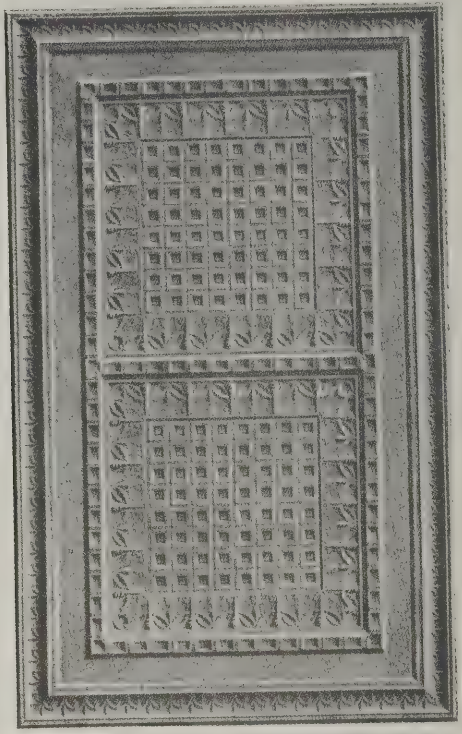
There are various methods of forming the joints of the ceiling, each manufacturer having his own ideas as to the construction giving the best results and to some of these brief reference will be made in this article.

Metal ceilings and side walls can be applied directly over old plaster or any other form of ceiling in the case of remodeling jobs just as well as they can be advantageously applied in new structures.

The installation of metal ceilings is a kind of work in which the country builder and especially the sheet metal contractor is deeply interested for it is something which can be done during the winter months as well as in the regular building season. It is inside work and offers excellent opportunity for the wideawake and progressive man who desires to keep himself occupied the year round and in building up his business establish a reputation which will make his name known throughout the community.

Artistic design in the interior of a building is fast becoming an item of importance to every contractor and builder as this part of the structure being most in evidence greatly adds to or detracts from its beauty as a place of habitation or for the conduct of business. The use of stamped sheet steel in interior decoration is of comparatively recent origin and in Fig. 1 of the illustrations we show a ceiling plate in the French Renaissance style which exemplifies what is being accomplished in this direction. Special care has been taken to bring out the massive detail in a pleasing and attractive manner and any number of combinations may be worked out with this plate as the central figure. The design represents one of a multitude brought out by the Edwards Mfg. Company, 423-443 Eggleston avenue, Cincinnati, Ohio, who are making unusual efforts to interest carpenters and builders to take up the steel ceiling proposition and are offering inducements at this time to one man to represent them in each community throughout the country.

A design of ceiling which is especially suitable for use in narrow rooms and halls as well as in places where the ceilings are low is that illustrated in Fig. 2. It is a pleasing combination; the embodiment of taste and style, and has been brought out by the Canton Metal Ceiling Company, 1946 Harrison avenue, Canton, Ohio, as a special theater design. It is made of standard 29 gauge ceiling stock and the joints are constructed by carefully lapping the formed beads over each other. The greater care that is exercised in connection with this particular part of the work the more attractive the results. In some instances the metal ceilings may be applied direct to the joists and wood sheathing but in the majority of cases it is better to make use of furring strips. The ceilings are given a good coat of special gray factory primer before shipment which protects them from rust in transit and gives them a foundation coat for further decoration. The use of a gray primer is regarded as an advantage due to the fact that it can be covered over when decorated at less cost than where a dark primer is utilized.



Sheet Metal for Interior Decoration.—Fig. 2—A Design Especially Suitable for Narrow Rooms and Halls

In designing a metal ceiling it may be interesting to state that the desired patterns are modeled in clay and plaster of paris casts made of them from which are produced the heavy steel dies used in the press for stamping the metal. Consideration of course must be given in the designing to the depth of the panel of the "draw" and to see that the strain or stretch is equal in all directions so as not to fracture the metal or force it into some undesired shape. The stock must be of the right analysis properly rolled and tempered and in this connection it is well to note that for the production of deep panels a very different stock is necessary than that which is used for flat designs or embossed plates. The Wheeling Corrugating Company, Wheeling, W. Va., one of the many applications of whose sheet metal ceiling designs is shown in Fig. 3, point out that in steel the gauges used vary from 28 to 30, depending upon the depth of the panel of the design to be produced. In addition to steel the company in question stamps ceiling designs from special analysis iron, zinc and copper. In the heavy steel dies the "draw," embossing and bead joints are all made and taken care of in the casting, but in the Wheeling ceilings the company goes a step farther, and with special machines, dies and punches, all lapping beads are repressed so that each bead is a perfect counterpart of all other beads and the nailing points of each outside bead are blanked out, this insuring quick work and properly erected designs with a saving of time and money for the sheet metal worker and the owner. One of the latest uses to which the company has turned its metal ceiling material is in the construction of counter fronts.

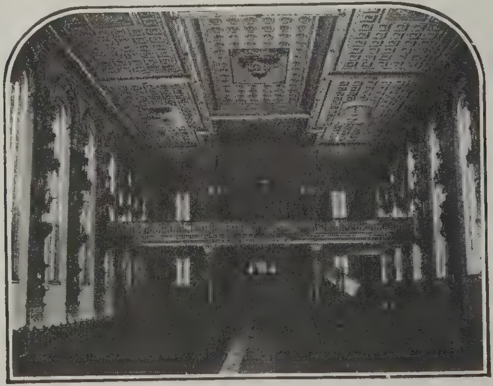


Fig. 3—Appearance of Metal Ceiling When Applied to the Interior of a Building.

One of the ceilings now on the market involving the well-known lock joint is that which we illustrate in Fig. 4 made by the Kinnear & Gager Mfg. Company, Columbus, Ohio. This interlocking slip joint or quad lock joint, as it is called, insures safety of construction, the arrangement being such that the ceiling can readily be applied directly over old cracked plastering if desired with the confident assurance that it will not fall down. Another feature of this ceiling construction is doing away in many instances with wood brackets, except at the intersection of cornice miters. The picture also represents one of the company's ceiling plates of neat and effective pattern.

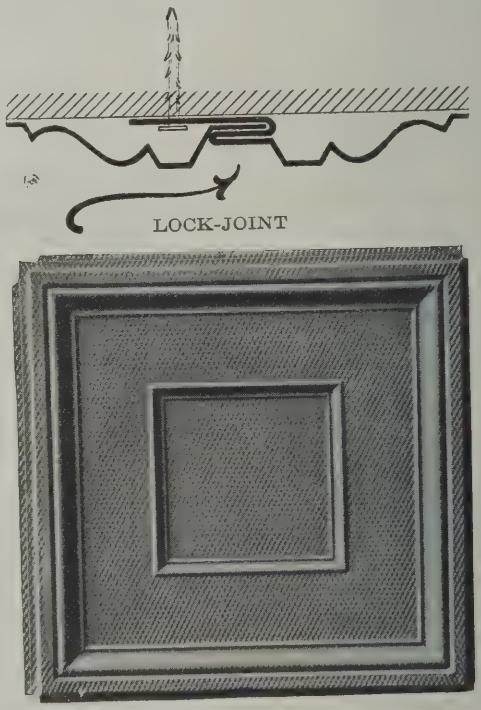
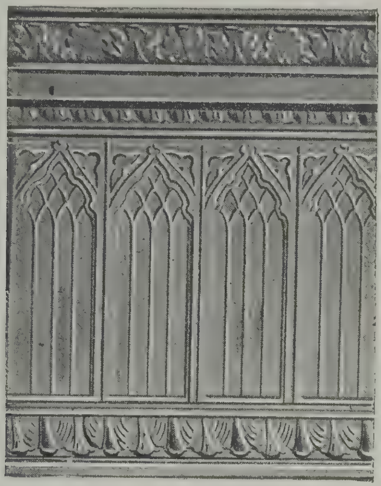


Fig. 4—Design of a Metal Ceiling in Which Use Is Made of a Lock-Joint

A design in sheet metal especially adapted for side walls in the form of wainscoting or dado, as some may term it, is illustrated in Fig. 5 of the accompanying engravings. This is the product of the Penn Metal Company, 201 Devonshire Street, Boston, Mass., the ceilings involving the use of only three members and three furring strips as contrasted with the old style requiring five members of each. Another fact of considerable importance in connection with the manufacture of the ceiling is that the texture of flat sheets differs, some sections being more fibrous and tougher than others, also in the rolling, one part of the sheet may be slightly thicker and heavier than are others and realizing this the company has made use of the hydraulic press method of stamping which insures a finished plate free from strains, cracks and buckles. It also avoids the sharp blow of an ordinary drop hammer on a sheet and enables the use of heavier stock.



Sheet Metal for Interior Decoration.—Fig. 5—Design of a Side Wall or "Dado"

In the ceiling design, shown in Fig. 6, the lock joint is used wherein two edges of the plates are double edged and two single edged at such a sharp angle as to render the sheet perfectly stiff. This method as pursued by S. Keighley Metal Ceiling & Mfg. Company, Pittsburgh, Pa., renders cross strips unnecessary and no nails are required except at the corners of the plates. The single edge is inserted into the double edge of the sheet next adjoining and the two are pressed together with a tool made for the purpose. This makes a seam so stiff and tight that it cannot be pulled out irrespective of the degree to which the joints or furring strips may warp in drying out. A rosette finishes at the corners covering the nail heads, and when pinched tight to the seam completes the joint that is said to be air-tight and dust-proof. The company includes in its output both lap joint and lock joint ceilings, but special attention is given to the latter style of construction.

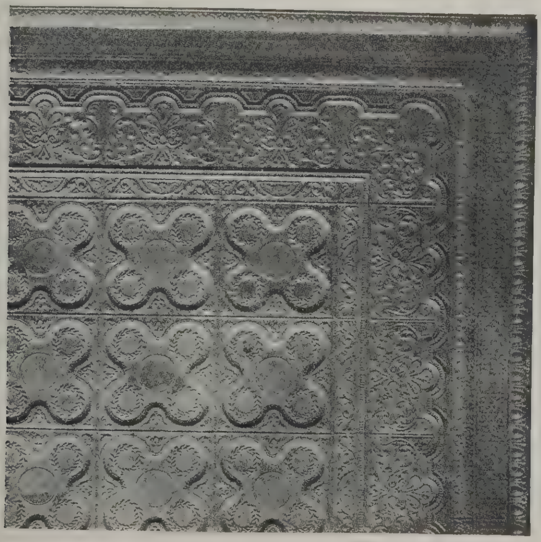


Fig. 6—Another Sheet Metal Ceiling Construction in Which a Lock Joint Is Used

Still another design of ceiling which will prove highly effective in carrying out the interior decoration of a room, especially in connection with churches, hospitals, schoolbuildings, stores, dwellings, theaters, etc., is that illustrated in Fig. 7. It is included in the product of the New York Iron Roofing & Corrugating Company, First and Washington Streets, Jersey City, N. J., and is made under the well-known Sagendorph's patents covering metal sectional ceilings and side wall decorations. The ceilings are so made as to be readily applied by the contractor.

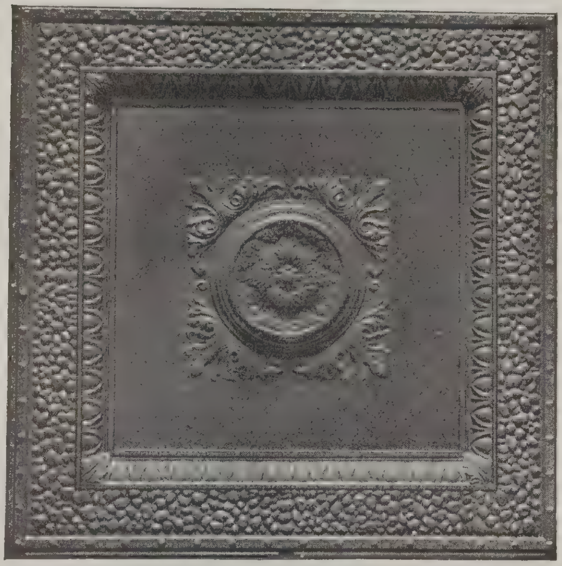
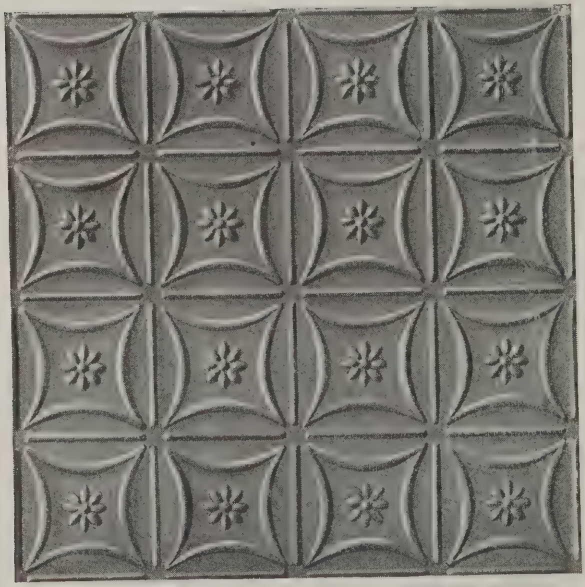


Fig. 7—An Artistic Design of Ceiling Plate Suitable for Buildings of Various Kinds

In discussing the question of the extent to which metal ceilings are used for interior decoration of dwellings the Brooklyn Metal Ceiling Company, Brooklyn, N. Y., states that its records show that 68 per cent. of its ceilings are erected in private houses, thus demonstrating the growing popularity of this form of ceiling. Private houses, of course, require light and rather delicately stamped patterns, while those for business houses and public buildings require designs somewhat more bold in character and deeply stamped.

As regards the construction of metal ceiling plates the St. Paul Roofing, Cornice and Ornament Company, St. Paul, Minn., prefer the lap joint rather than the lock joint. The point is made that lap joint plates can be erected with great speed and that by the clever use of beads and buttons impressed into the design of steel ceilings it is extremely difficult for the naked eye to discover the position of a nail head. If the erector before decorating the ceiling goes over the work closing up the joints with his mallet it is a simple matter to conceal all the joints with a decorating coat. Again the lap joint ceilings can be made in long sheets ranging from 2 to 8 ft. in length, thus greatly facilitating the work of erection. For the decoration of steel ceilings a paint mixed for that purpose and that will dry with a dull flat finish without gloss should be used. This will tend to bring out the artistic details of a ceiling design much more clearly than would be the case if it were treated in some other way and render it more pleasing to the eye.

The attractive yet inexpensive design of metal ceiling field plate shown in Fig. 8 is among the latest which have been brought out by the Brier Hill Steel Company, Youngstown, Ohio. It will be observed that the stamping is unusually clear and the point is made that it is economical to erect. Combined with its inexpensiveness is its adaptability to almost any kind of interior treatment, for while it is simple in design it is not severely plain. In bringing out these goods the company has a special machine for recutting all the beads in the metal ceiling dies. This recutting is a regular operation and is accurate to within 1-1000 of an inch. This unusual attention to what may seem a minor detail is the result of a determination to overcome the difficulties which the erector often experiences because of varying depths and clarity in the formation of the beads. This leads to imperfect fitting of one ceiling plate over another. Particular attention is also given to the matter of shearing as this is an important item because inaccurate shearing means that every plate has a little flange of steel left on the outside of the bead or that the beads are partially cut off, all of which tends to make difficult the work of erecting and gives an ill-appearing job when finally completed.



Sheet Metal for Interior Decoration.—Fig. 8—An Effective Yet Inexpensive Design of Metal Ceiling

The Tiffin Art Metal Company, Tiffin, Ohio, was one of the first houses to recognize that actual real art should be applied to metal ceilings and as a result of this it departed from the beaten path and has brought out a line of plates that are neither too severe nor overloaded with confusing ornament, but consist of simple, classic and harmonious designs pleasing to the eye. One of these designs is illustrated in Fig. 9, the work being done with the straight continuous double bead lap which is both dust-proof and invisible. It goes without saying that in order to produce the most pleasing effects in metal ceiling work sufficient attention should be given to make sure that it is properly done, for a poorly executed job is the most expensive in the end, while on the contrary good work is ultimately the cheapest.

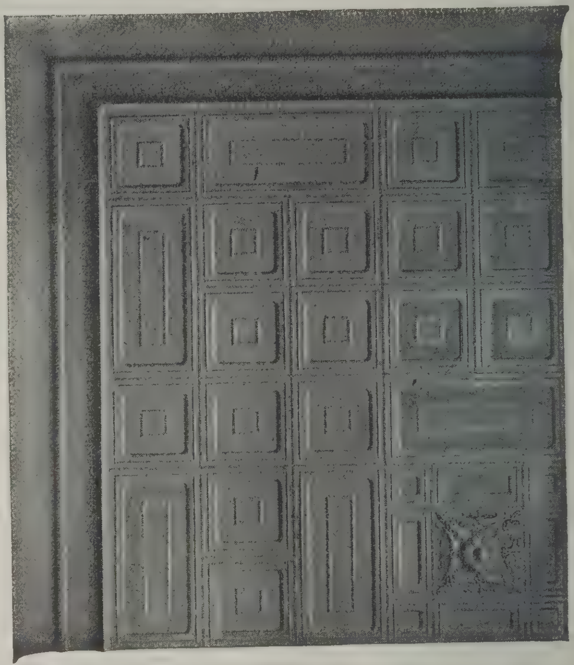


Fig. 9—A Ceiling Plate Which May Be Variously Used

◆

Owner and Contractor Liable

Judgment was rendered January 15 in Judge Brown's department of the Superior Court in Oakland, Cal., for the sum of $9,000 in favor of Ida L. Givens vs. Enoch Morrill and Geo. F. King. Plaintiff's husband was a carpenter who was killed by falling from the second floor of the Morrill apartments, being constructed in Berkeley. Enoch Morrill was owner and Geo. F. King the contractor. The jury held the owner liable with the contractor under the act of Legislature approved in March, 1909, which provides that the owner must see that the contractor provides proper scaffold boards for the protection of workmen on a building more than three stories high in the course of construction.

◆

David Stephens, who erected some of the best buildings in the Central West, and formerly a member of the contracting firm of Stephens & Larkin, Rock Island, Ill., died recently at the age of 75 years. He was born in Wales October 17, 1838, and early in life learned the trade of stone cutter. He came to this country in 1870, settled in Rock Island and lived there until the time of his death.

◆

There is a special regulation as to the exhibition of building stones that are to be shown at the Panama-Pacific International Exposition to be held in San Francisco next year, and that is that the specimens shall preferably be in the form of 8-in. cubes but not larger than 12-in. cubes. One face of a cube shall be polished and the other faces finished to show various features and qualities of the stone.

New Publications

Estimators' Price Book and Pocket Companion.—By I. P. Hicks; size 3¾ x 6 in.; 218 pages. Bound in board covers with side and back titles. Published by *The Building Age* Technical Book Department, 239 West 39th Street, New York City. Price, $1.00 postpaid.

This as its name indicates is a guide to prices of all kinds of building materials together with handy rules, tables and general information for the architect and builder. The matter has been revised throughout, thus bringing it with the prices presented fully up to date. There are 52 pages of new matter which have been added and throughout the work ample spaces have been left for the insertion of local prices, memoranda, etc. The entire matter has been classified according to the nature of the work and it will be found of unusual interest and value to the practical estimator, contractor and builder.

The subject matter is comprised in 22 chapters with introductory remarks touching the preparation of estimates. In the early pages are discussed excavating, stone work, plain and reinforced concrete, cellar bottoms and walks, brickwork and hollow building tile. The dimensions of standard size blocks are given, also a statement of their equivalent in brick laid in the wall.

One chapter is taken up with masonry tables showing safe bearing loads, etc., another chapter gives a schedule as a guide for the estimator, following which the subjects of plastering, carpentry, iron work, heating and ventilation, tile work and painting are considered. Chapter 20 is devoted to a classified list of items so that the estimator will omit none when figuring. Chapter 21 is given up to approximate estimates by the cubic foot, while the last chapter is composed of various useful tables.

The work is of a size to be readily carried in the pocket and the 14 pages of cross reference index will be found a most convenient feature for the man in a hurry to find a specific matter.

In the author's preface it is pointed out that almost everything required in the construction of the ordinary building has been considered together with average market prices. The items have been arranged in such a way as to enable the estimator to readily find what is wanted both in regard to size, weight and prices. The work is designed to supplement that section of "Hicks' Builders' Guide" which relates to estimating with a more comprehensive reference to prices and material and labor.

The Hollow Tile House.—By Frederick Squires; 208 pages; size 7 x 10 in. Illustrated with 215 half tone engravings. Bound in cloth. Published by the William T. Comstock Co. Price, $2.50.

While the title is sufficiently suggestive to outline the scope of this work, it does not convey the fact that the general reader will find the subject of tile making discussed from a historical standpoint, with a chapter devoted to old world stucco, a history of hollow tile for houses, an interesting section on the flat-roofed house and several other chapters to the lighter side of the subject. The illustrations are worthy of special mention because of their excellence, both from the artistic quality of the photographs and the excellence of the printing. The half tones are executed upon a quality of paper which brings out the gray tints so desirable in reproductions of architectural work, while there are numerous scenic views interspersed throughout the pages of the book which are well selected and greatly add to the artistic qualities of the work. The book is well written, from the introduction, which jumps into the subject like a well told short story, to the last page, which voices a protest against the glorification of ancient precedent.

The Expert House Painter.—By A. Ashmun Kelly; 597 pages size 5 x 7½ in. Bound in cloth. Published by the Master Painter Publishing Co. Price, $3.50.

Painting is one of the most important operations in the construction of a dwelling, and, while the tricks in every trade are many, there are few that offer more temptation for the performance of inferior work which can be detected only by the expert than that of painting. For this reason the builder and especially he who undertakes general contracting work, is interested in the acquisition of sufficient knowledge of the subject of house painting to enable him to converse intelligently upon the subject, and to detect poor work or substitution of inferior material. The book mentioned above is described as "a complete exposition of the art and practice of house and structural painting, interior and exterior," and as its author is editor and publisher of the *Master Painter*, a monthly magazine devoted to the interests of that trade, the information therein contained should be reliable. The book offers no apology in the form of an introduction, but plunges immediately into the practical side of the work, the first section bearing the title: "Painting Woodwork-Interior." A quotation from the first paragraph will indicate the style of treatment better than a comment: "The priming of interior woodwork is done according to the character of the wood. Treatment of the old white pine wood, scarce now but dear to memory still, requires little description; well thinned white lead paint, little driers, is all that is required, but, as much of the white pine of today contains much sap and hard spots, these require attention. The sap will require touching up with an extra coat. The hard parts will need to be well brushed out with heavier or less oily paint."

As will be seen, the author essays to solve the hard problems rather than to skim over the easier parts of the subject. The space covered by the book permits the ample treatment of a large number of points involved in the coating of various surfaces with mixed pigments.

The municipality of Buenos Aires, Argentine Republic, has contracted for the erection of 10,000 houses for employes and workmen, construction to be at the rate of 2,000 houses a year.

Current News of Builders Exchanges

Results of Some of the Annual Meetings with Elections of Officers—Celebration by the Lansing, Mich., Exchange

North Dakota Association of Builders Exchange

The recent convention of the North Dakota Association of Builders and Traders Exchanges closed with a banquet given by the Fargo Builders and Traders Exchange which was one of the most successful ever held by that organization. It was in reality the tenth annual banquet of the Fargo Exchange and among the many interesting speakers were Eugene Young, secretary of the Builders Exchange at Minneapolis; Superintendent Hoover of the Fargo Public Schools; ex-Mayor V. R. Lovell; George B. Hancock, one of the leading architects of Fargo, and Secretary J. P. Hardy of the Fargo Commercial Club.

The Committee of Arrangements consisted of Secretary Victor Leeby of the Fargo Builders Exchange; Emil Anderson, P. L. E. Godwin and T. L. Sykes.

The officers elected by the North Dakota Association of Builders Exchanges for 1914 were as follows:

President.........P. L. E. Godwin of Fargo.
Vice-Presidents,
J. D. Turner of Grand Forks.
D. A. Dinnie of Minot.
Thomas Berge of Grand Forks.
Sec.-Treas....Victor H. Leeby of Fargo, N. D.

Detroit Master Carpenters Association

The annual meeting of the Master Carpenters Association of Detroit, Mich., was held in January when the following officials were chosen:

President....................H. D. Yatzek.
Vice-President.............B. F. Haberkorn.
Secretary......................A. A. Rose.
Treasurer......................D. V. Wolf.

The board of directors consists of the above officials with A. B. Maclean, Louis Schmidt and Joseph Alfes.

Officers of Chicago Builders Exchange

At the annual meeting of the Builders and Traders Exchange of Chicago held at their headquarters on Monday, January 19, officers for the ensuing year were chosen as follows:

President..................John D. Corlett.
First Vice-President.........W. L. Hoffman.
Second Vice-President........August Pahlke.
Treasurer..................J. E. Lindquist.

At this meeting directors were also chosen, these consisting of G. C. Haffner, A. C. Jaeger, Louis Krek, A. C. Preble and L. C. Vogel.

There were 52 new members added to the roster during the year and the reports of the various officials and committees showed the Association to be in a flourishing condition. It is interesting to note this is the third successive year Mr. Corlett has been elected president.

Members of Lansing Exchange Celebrate

The members of the Builders and Traders Exchange of Lansing, Mich., celebrated early in the year, the first anniversary of the organization with a banquet at the Hotel Wentworth. There were 73 members present and the toastmaster was C. E. Holmes, superintendent of the School for the Blind.

Among the speakers were Mayor Reutter, who referred to the good which such an organization as a Builders Exchange can accomplish for a city; Z. C. Goodell, an expert on compensation insurance, gave an instructive talk on the Compensation Law in Michigan, which he said was the most just to employer and employee of any of which he had knowledge; Secretary C. S. Wilcox of the Lansing Exchange reviewed the history of the organization and urged legislation that would drive out the unscrupulous contractor; H. G. Wright, a member of the firm of Wright & Prall, contractors, advocated admitting to membership in the Builders Exchange of the leading cities throughout the state the contractors in the smaller towns where there was no such organization. He also said that the architect should be compelled to assume some responsibility that the contractor is now forced to shoulder.

One of the most interesting characters of the meeting was John N. Bush, an honorary member of the Builders Exchange and who is something over 93 years old. In his talk he reviewed the building progress that has been made during the last 80 years.

New Secretary of Columbus Exchange

The many friends of John A. Kelley will be interested in learning that on February 10 he severed his connection as secretary of the Builders and Traders Exchange of Columbus, Ohio, and assumed the position of manager of the Industrial Bureau of the Chamber of Commerce of that city. Mr. Kelley is succeeded as secretary of the Builders and Traders Exchange by Clarence Metters, who has had extended experience as a newspaper man.

Meeting of Minneapolis Builders Exchange

The annual meeting and election of the Builders Exchange of Minneapolis, Minn., was held early in January, the business session being preceded by a luncheon served in the Exchange rooms at 17 South Sixth Street. The selection of officers for the ensuing year resulted in the following choice:

President..................M. Schumacher.
Vice-President..............John McDonald.
Second Vice-President......James H. Brown.
Treasurer....................L. C. Warner.
Secretary..................Eugene Young.
Sergeant-at-Arms.............Chas. Fisher.

A Committee on Complaints was appointed with Aaron Carlson as chairman.

Reports of officers and committees were presented, the secretary's report showing that during 1913 there were 235 meetings of the different allied organizations held in the Exchange rooms; 27,500 pieces of mail matter were sent out from the office and 780 plans for buildings outside of Minneapolis were filed and figured upon. There is at present on the roster 280 active and 85 non-resident members, giving a total of 365.

Officers of New Orleans Exchange

At the annual meeting of the Contractors and Dealers Exchange of New Orleans, La., officers were elected for the ensuing year as follows:

President...............Walter F. Jahncke.
Vice-President.............Herman Thomas.
Treasurer....................J. P. O'Leary.
Secretary.................R. L. McChesney.

These officials are all prominently identified with the building interests of the city, President Jahncke, who was re-elected to the office for the third time, being regarded as one of the ablest of the younger business men of New Orleans and is classed as an expert in the general handling of building materials and builders supplies. He is the general manager of Fritz Jahncke, Inc., a firm of long business standing and well known throughout the building supply trade of the country.

At a recent meeting of the Board of Directors of the Contractors and Dealers Exchange a resolution was introduced whereby it is proposed to increase membership of the Board to 30.

The Yale & Towne Mf Co., Stamford, Conn.

The Wonder of Ventilation

Burt Ventilators do wonderful work in clearing buildings of fumes, smoke, and bad air, providing instead a continuous supply of fresh air.

Leading manufacturers all over the country are recognizing Burt superiority, by supplanting their old ventilators with ours.

The makers of the famous Yale Locks write us, in part as follows:

"The ventilators have given us excellent satisfaction. We are pleased with the principle of design, in fact, at the time of building we had begun the design of a regulating ventilator for our own use............when our investigation brought the Burt Ventilator to our attention."

This firm originally ordered twenty 18″ Burt Ventilators. Just lately they have sent an additional order for twenty more—of the 24″ size.

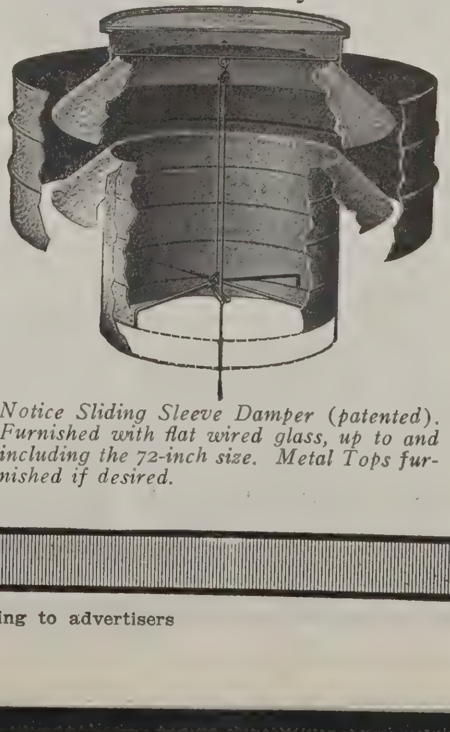
There's a reason. Our catalog will explain.

Remember this advertisement—and write when you have time.

Send for our 128-page catalog giving fine illustrations of mills, shops, factories and residences where "Burt" Ventilators are in successful use.

The Burt Manufacturing Co.
312 Main Street, Akron, Ohio

GEO. W. REED & CO., Montreal, Sole Manufacturers of "Burt" Ventilators for Canada



Notice Sliding Sleeve Damper (patented). Furnished with flat wired glass, up to and including the 72-inch size. Metal Tops furnished if desired.

B B

Kellastoned Home
of John Wilson, Esq.
Memphis, Tenn.

Make Your Buildings Distinctive, Attractive and Lasting with Kellastone

Kellastone is an imperishable exterior or interior stucco that can be applied to both new and old frame, brick or stone buildings at any season of the year, warm or cold.

It hardens like rock and practically forms a stone covering over any building to which it is applied that will last for ages.

And yet, while it is so hard that it is difficult to break with a hammer, it is so elastic that settling buildings seldom cause it to crack or mar its beauty in any way.

KELLASTONE
IMPERISHABLE STUCCO

is a non-conductor of heat or cold. It is fireproof and commands the lowest insurance rates. It never needs painting, never chips, never peels, never needs patching up.

Kellastone has a wonderful tensile strength. It can be applied to give a rough cast or smooth finish and always lends a tone of class and distinction to the most modest home or pretentious estate.

The neat, attractive appearance of Kellastoned buildings always brings higher prices and rentals. It is bound to please both contractor and owner in a hundred ways.

Our new, beautiful catalog very graphically shows the wonderful possibilities of Kellastone. It also proves the absolute truth of all of the above claims. Send for a copy today.

Lumber and Material Dealers—Write for Special Terms and Unassigned Territory.

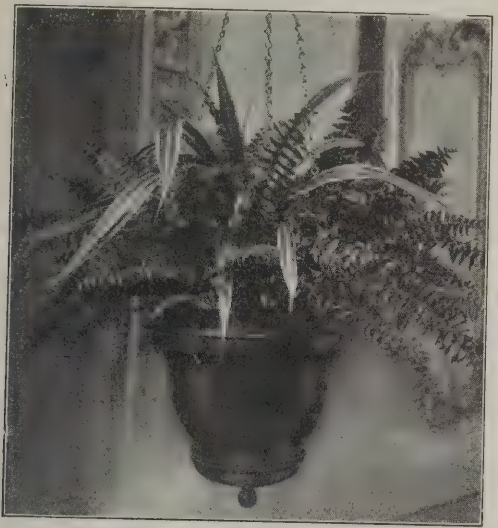
The National Kellastone Co., Dept. 6, 19 South La Salle St.
Chicago, Illinois

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to
do with the Various Branches of the Building Business

The "Illinois" Self-Watering Hanging Baskets

The housewife who enjoys growing flowers and plants in the home knows the annoyance of watering them when they are contained in hanging baskets, for as a general thing they must be carried out of the house to be watered and the requirements are such that this operation has to be performed at least once every day and sometimes more often. A hanging basket which is designed to overcome the annoyance mentioned has just been brought out by Miller & Doing, 39-41 York Street, Brooklyn, N. Y., and in the illustrations we show its mechanism and general appearance. The baskets are offered under the name "Illinois" and are constructed entirely of heavy sheet zinc spun into form and without any seams whatever. Fig. 1 is a picture of one of these hanging baskets as it appears in use in the home. A reference to Fig. 2 affords an excellent idea of the construction employed. The water container is just under the false bottom of the basket and can be easily detached, refilled and returned to its place. Extending through the false bottom is a sponge, one end of which rests in the water of the container while the other is within the soil of the basket. The sponge draws up the water slowly and feeds the roots of the plant exactly the right amount to make the life and growth of the plant a certainty. The point is made that it is only necessary to fill the water container once a week and this can be accomplished from the floor without disturbing the basket or requiring the use of anything on which to stand. Another point is that the baskets can be used in a library or parlor, or in fact any desired place without danger of damaging the most delicate furniture or fabrics, as the dripping of water is said to be impossible. These hanging baskets are made in three sizes, the 9 and 10 in. diameters having a water capacity of 2 pints each and the 12-in. basket a capacity of 3 pints.



The "Illinois" Self-Watering Hanging Baskets.—Fig. 1—One of the Baskets in Actual Use

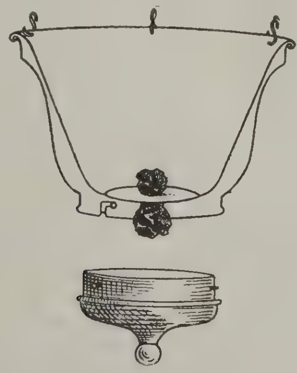


Fig. 2—Details of One of the Spun Metal Baskets

The firm also makes under the name "Illinois" self-watering window boxes which it is claimed can be placed in any window with the perfect assurance that no annoyance will be caused by leakage and consequent damage to the property. A window sill 3½ in. wide or over is sufficient for the box. The firm makes special linings having the self-watering feature to fit any size or shape of jardinières, vases or boxes.

Nicholls Expansion Take-Down Square

An important improvement in steel square construction is that which has recently been incorporated in the square turned out by the Nicholls Mfg. Company, Ottumwa, Iowa, and the details of which are illustrated in Fig. 3 of the engravings. This square is constructed with bearings accurately machined so as to bring the square absolutely true when the cam provided for the purpose is turned in such a way as to expand the end of the body in the milled portion of the tongue. The parts of the square are fitted by hand, thus making a perfect joint. The claim is made that tests have shown that the joint could wear 1/32 in taking the square apart and putting it together, and still the cam would expand the end of the body and take up the wear, leaving the square still rigid and solid at the joint. Emphasis is laid upon the fact that the tongue is not cut half in two where it joins the body—the weak point in the average take-down square—but by having the body slip into the tongue, strength is produced which enables it to successfully withstand the shock when thrown on the bench or over a joist. The cam is so constructed with beveled head as to hold the end of the body down when the square is locked. The manufacturer has had considerable experience in the line of take-down

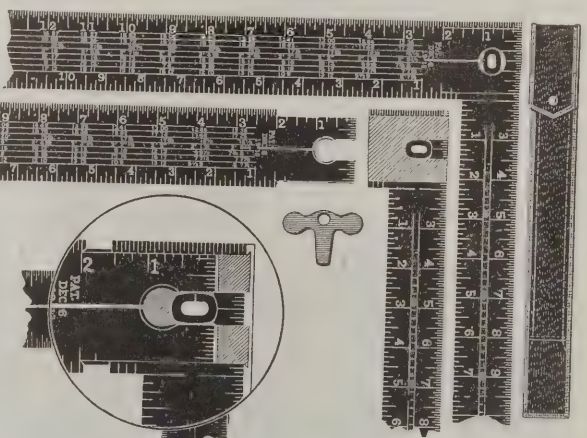


Fig. 3—The Nicholls Expansion Take-Down Steel Square

squares and realized the fact that a key is very easily lost, and for this purpose there is inserted in the cam an oblong hole which enables the square to be taken apart or put together by the use of a screw driver, a nail, the end of a file, or of any blunt instrument usually carried by the carpenter.

These squares are made containing the well-known Nicholls framing rule giving lengths and cuts of all rafters for 16 different pitches of roofs. This is the company's No. 500-R and has the same markings as the 100-R. The former has the regular roof framing rule on the one side and the octagon roof framing rule on the other. It may be of interest to some of the readers to know that the company will refinish and refit all old take-down squares for a nominal sum. The company issues a booklet explaining the rafter framing rule, which it will send free to any carpenter or builder furnishing his name and address.

Attractive "Leader" Showroom in Chicago

That a wide variety of "Leader" specialties manufactured by the Leader Iron Works, Decatur, Ill., are advantageously displayed at the Chicago office, located in the Monadnock block, Dearborn street and West Jackson boulevard, may be seen from an inspection of Fig. 4, which portrays a corner of the showroom. The water supply apparatus displayed includes at the left a 2-hp. "Leader" engine, with the jacket to valve chamber cut away to show the interior construction and enable its operation to be demonstrated to advantage. At its side are two of the company's gasoline pumps, pint and quart sizes, respectively, for use in private or public garages. The adjacent outfits are a power pump and jack mounted on the same base and a separate pump jack suitable for attaching to any low down force pump.

In the corner behind the chair is to be seen a complete water supply system suitable for pumping from a cistern or shallow well. The window equipment consists of an electric automatic outfit also for cistern or shallow well use, and a 1-hp. gasoline direct connected pumper equipped with a shift gear so constructed that the user can instantly detach the pump, allowing full use of the engine for other purposes. On the floor at the right is seen a 2-hp. direct connected shallow well pumper and a 3-hp. direct connected gasoline deep well pumper, both being fitted with positive air compressors for use in connection with hydro-pneumatic tanks in complete systems. W. V. Pettit is Chicago manager, succeeding R. C. Burmood. Mr. Pettit has had considerable experience in handling "Leader" water supply systems as Illinois and Missouri representative and is at present producing an increasing volume of business from his territory.

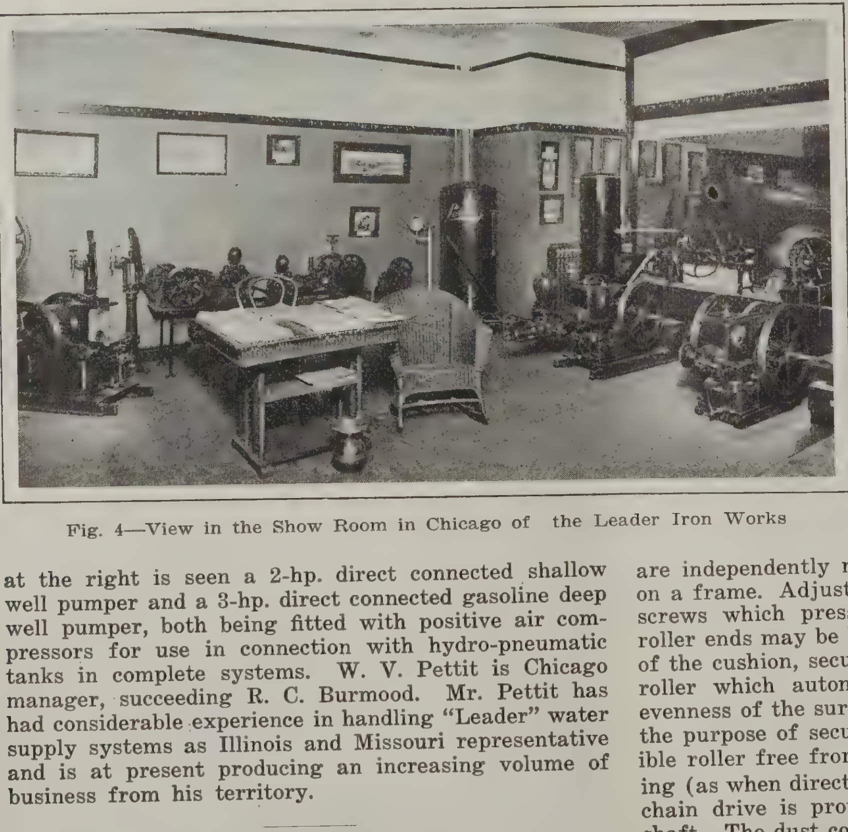


Fig. 4—View in the Show Room in Chicago of the Leader Iron Works

Addition to Staff of Simonds Mfg. Company

The trade will be interested in the announcement that William Miller, for the past 37 years in the service of Henry Disston & Sons, Philadelphia, Pa., associated himself on February 1 with the Simonds Mfg. Company, Fitchburg, Mass., and Chicago, Ill. Mr. Miller is without doubt one of the most experienced and efficient men in the saw, knife and file-making business and enjoys a very extensive acquaintance among the trade throughout the United States and Canada. He has been successful throughout his many years of practical life in the saw-making industry, and he brings to the Simonds Mfg. Company his good will, energy, enthusiasm and a conscientious desire to serve the customers in a way to prove entirely satisfactory.

An Automatic Electric Floor Surfacing Machine

Among the many devices now on the market designed to surface floors and embodying features in which building contractors, floor layers and others cannot fail to be interested is the machine illustrated in Fig. 5. It consists of a frame supported on a pair of truck wheels; with a roller mounted in front around which is fastened sand paper or other abrasive material, and actuated by an electric motor receiving power through a trailing wire. Exhaust fans mounted in the frames remove the cuttings from the floor and the entire machine is controlled from a handle fitted with a brake-gauge. The roller is covered with heavy non-stretchable felt which makes an elastic base for the sand paper, tending to produce even surfacing. The sand paper or other abrasive material is tightly held about the roller by a pair of heavy interior rollers which securely clamp the two ends of the sand paper inserted through the roller slot. The latter is narrow and stretches diagonally across the roller surface. It is stated that one sheet of sand paper will last about 3¾ hr. Each machine is furnished with a metal pattern by which the sand paper may be cut to fit the roller. Special attention is called to the fact that the machine is provided with a pair of adjustable irons which support the roller. These are cast of heavy material and are made of extra length, securing great leverage against the floor for rapid work. They are independently movable, and are pivotally mounted on a frame. Adjustment is secured by means of thumb screws which press against the cushion so that the roller ends may be leveled with the floor and, by means of the cushion, secure a flexible but firm control of the roller which automatically adjusts itself to the unevenness of the surface as it moves over the floor. For the purpose of securing a smooth running though flexible roller free from motor vibrations and chain jumping (as when direct connected to the motor), an indirect chain drive is provided by means of an intermediate shaft. The dust collector consists of two 9-in. diameter exhaust fans, running at high speed on ball bearings. The dust, cuttings, etc., are sucked up through an air-tight throat and hood and drawn into a cloth sack.

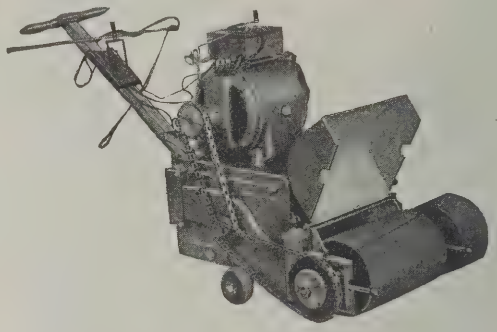
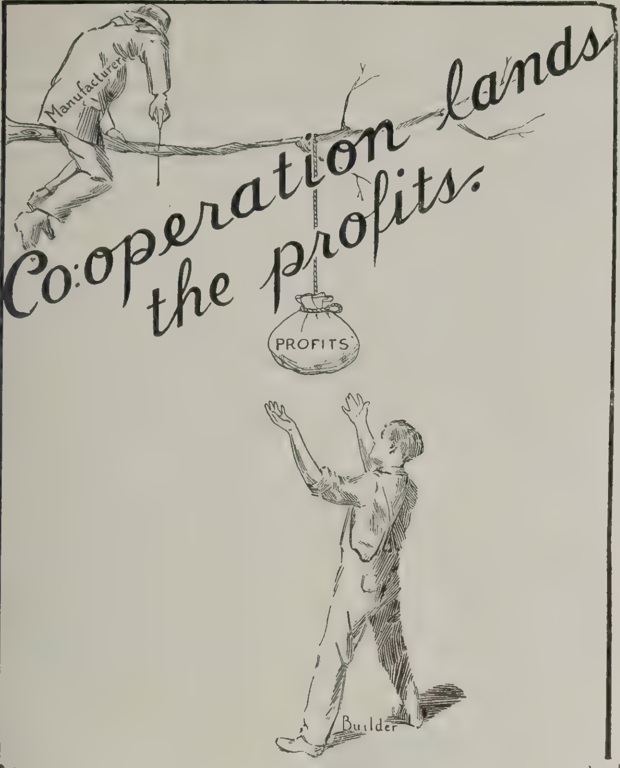


Fig. 5—General View of the Automatic Electric Floor Surfacing Machine with Hood to Roller Raised



Get All the Roofing Business in Your Town

This is the biggest and best profit-sharing plan ever offered. A new manufacturing process makes it possible. As reliable as a national bank. Take this opportunity while you have the chance. Don't let some one else beat you to it.

You are interested in cutting down building costs. You will be quick to see the advantage of our big offer. You can save money on every roof. You can make big profits on this proposition.

We Want Your Help

One representative in every town where we have no agency. We are an old, reliable manufacturing concern. It's a connection you'll be proud of. You'll be treated fair. Your profits will be large and sure. Will you be the one?

NOW IS THE TIME

to sit down and write us for full particulars. Now is the time to make arrangements to co-operate with us and get a fair share of the profits. Write us today without fail. It costs you nothing to find out. It's a respectable, dignified proposition.

Write—Today or Tonight

McHENRY-MILLHOUSE MFG. CO.
South Bend, Indiana

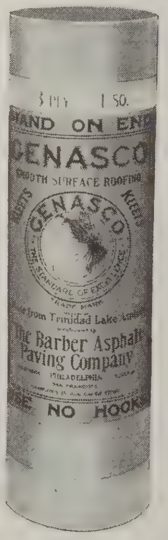
— McH-M Co — McH-M Co — McH-M Co — McH-M Co —

Why not invest in permanent roofing?

Avoid needless expense for roofing that demands frequent repairs. Get Genasco, made of "Nature's everlasting waterproofer"—Trinidad Lake Asphalt.

Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

is a sure and lasting protection against sun, rain, snow, wind, heat and cold; it is attractive and economical as well.



Write us for samples and the Good Roof Guide Book. Ask your dealer for Genasco. THE KANT-LEAK KLEET makes seams water-tight without cement and prevents nail leaks.

The Barber Asphalt Paving Company

Largest producers in the world
of asphalt and ready roofing

Philadelphia

New York San Francisco Chicago

The Opening Door

Will swing softly on

STANLEY'S

BALL BEARING HINGES

with Non-Rising Pins

Write for Booklet "Properly Hung Doors"

To Department E

THE STANLEY WORKS

New Britain, Conn.

New York Chicago

S.W. S.W.

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895

TRADE MARK.

TWELVE MEDALS

of award at International Expositions

SPECIAL PRIZE

GOLD MEDAL

AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company

Philadelphia, Pa.

Owned and Operated by Nicholson File Company

This automatic ball bearing electric floor surfacing machine is made by Wayvell Chappell & Co., 4844 Ravenswood avenue, Department E, Chicago, Ill. The concern points out that it is made in three sizes, thus adapting it for use in small rooms as well as the largest areas. The company feels so confident that the machine will give entire satisfaction that it will fill orders for it on three days' examination and thorough trial.

The Drilhammer

A new tool especially designed for drilling holes and of interest to every contractor, builder, concrete worker, stone mason, and electrician in the country, as well as to all mechanics having occasion to use a cold chisel or drill and hammer, is the device illustrated in general view in Fig. 6 of the engravings. It is known as the "Drilhammer," and the power used in connection with it is centrifugal force. By means of this force two hammer elements are revolved so as to deliver upwards of 975 blows per minute upon the drill. The tool consists of a one piece malleable handle which gives a strong, steady grip, and mounted upon a steel cut spur gear which meshes with a small pinion on the main shaft is a crank. The shaft carries a steel spider at each end of which is pivoted a hardened tool-steel hammer element. These hammer elements are free to swing upon the spider with the result that when the tool is revolved they fly out and are held out by centrifugal force, moving around in their paths at high speed. The fact that with every revolution of the handle approximately 13 blows are struck by the hammers clearly emphasizes the time and labor saving which are obtained in the Drilhammer over the ordinary hammer and drill. The claim is made that one tool does the work of two much better and quicker and at less actual cost. As there are practically 13 blows given to the drill for every revolution of the handle and as the operator can easily make 75 turns of the crank per minute on the small machine, there are practically 975 blows struck every minute. It is interesting to note that the force of a blow does not depend upon the weight of the hammer with which it is delivered, but rather upon the mass or weight of the hammer elements and also upon their velocity. If the velocity is doubled the force of the blow increases four times. In the smaller machine the diameter of the spider is 4 in., consequently at a speed of 75 revolutions per minute the hammers travel at the rate of 468.75 ft. per minute, which is sufficient velocity to develop powerful blows.

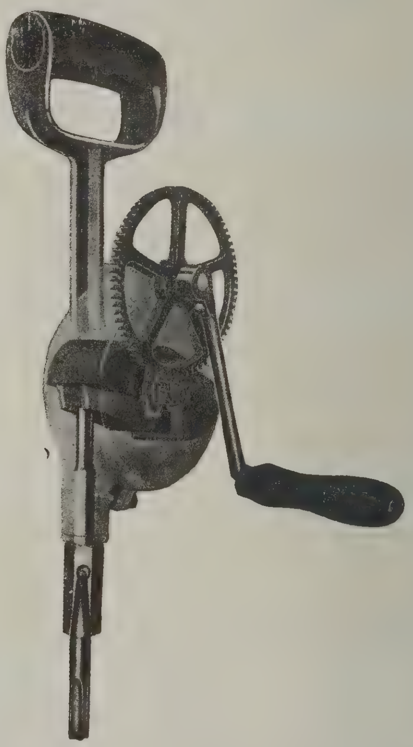


Fig. 6—General View of the Drilhammer Ready for Use

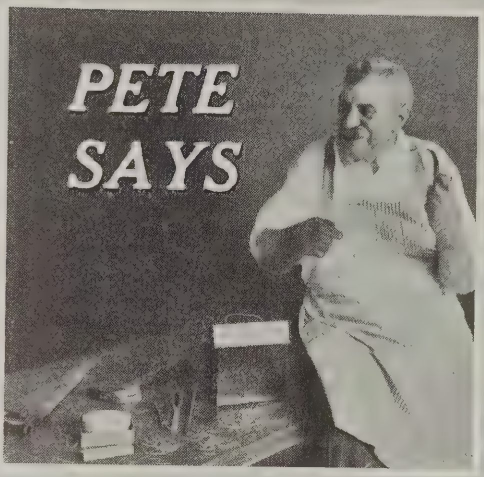
In a spring drill, if the operator wishes to increase or decrease the force of the blow it is necessary to stop drilling and adjust the tension of the spring, but with the Drilhammer the operator simply slackens the rate at which he is working the drill and the velocity of the hammer is immediately reduced and the force of the blow is lessened. This is one of the important advantages claimed for the Drilhammer over a spring hammer. Two sizes of tool are made, the smaller size being intended for holes ranging from ¼ to ⅝ in., while the second size is used for drilling holes ranging from ½ to 1¼ in. The tool accommodates any style drill used in such work. An extension can readily be applied to brace the Drilhammer against the ceiling or any other position where it cannot be readily held by the operator, this extension being particularly serviceable for electricians. This tool is being placed on the market by the Orr & Lockett Hardware Company, 14-16 W. Randolph Street, Chicago, Ill.

Sedgwick's Dumbwaiter and Elevators

There has just been issued from the press an attractive catalogue of 52 pages illustrating and describing the leading types of hand-power elevators and dumbwaiters adapted for all purposes made by the Sedgwick Machine Works, 123 Liberty Street, New York City. Attention is directed to the special features embodied in the goods turned out by this concern, while the simplicity of the mechanisms, the ease of operation and installation are comprehensively treated. The catalogue is interesting because of its historical value and shows the wonderful progress made in the mechanical field and particularly the development in power elevator and dumbwaiter manufacture and adaptability. It is recorded in Harper's Encyclopedia of United States History that 270 years ago, or, in 1643, General Robert Sedgwick and John Winthrop, Jr., established the first furnace and iron works in America at Lynn, Mass. For ten generations, except when called to the defense of their country in the Colonial and Revolutionary Wars, the Sedgwicks have continued in the craft, devising and fashioning from metal and wood those machines and mechanical devices which have contributed so largely to the wonderful progress of the United States, handing down from father to son the skill and experience accumulated during more than two and a half centuries of conscientious effort. In 1844 Charles Henry Sedgwick, whose likeness from an old photograph is reproduced on the first page of the catalogue in question, and who was the seventh direct descendant of General Robert Sedgwick, brought the business to its present location at Poughkeepsie. In 1893 Alonzo Sedgwick, son of Charles Henry Sedgwick, associated with Justus Ingersoll Wakelee, erected a new plant and concentrated their united energies on hand-power elevators and dumbwaiters. The business was incorporated on the first of September, 1913, under the laws of New York with Justus Ingersoll Wakelee as president and general manager, and Dwight Robert Sedgwick, son of Alonzo, as treasurer and factory manager.

The C. H. & E. "Buzzer"

In the January number of the C. H. & E. "Buzzer," the house organ of C. H. & E. Mfg. Company, Milwaukee, Wis., there is much interesting information about the portable saw rig turned out by this concern and the new all-iron type which formed the basis of some comments in the February issue of *The Building Age*. This is the first issue of the "Buzzer" and in it is told what "C. H. & E." mean. It appears that some years ago when the company built its first portable saw rig its inability to coin a new name for the manufactured product caused the makers considerable worry and after much delay it was finally decided that "C. H. & E." as a trade mark and firm name would make a lasting impression on the trade. The company was fortunate at the time in having in the firm three young men of different views and ability—one an experienced engineer and millman; one a sales and shop man, and the third well trained in advertising. Instead therefore of adopting the long firm name of Cheshire, Hase & Edwards Mfg. Company, the first initial of each name was taken to form the firm name of C. H. & E. The firm was incorporated under the laws of Wisconsin and



"To Have Well-Sharpened Tools is Half the Job."

Carborundum Sharpening Stones

KEEP Pete's tools right — they will yours. Just a few strokes on these quick-cutting, non-glazing stones and the edge is there — there is no rubbing. — Carborundum cuts, leaving an edge that will stand up on the job.

Ask your hardware dealer to show you the round or oblong Carborundum stones for general work — every stone guaranteed.

THE
CARBORUNDUM COMPANY
NIAGARA FALLS, N. Y.

A book of pointers for specifying paint

Painting is a pretty complex subject. Naturally you're often puzzled to know just what paint and varnish to specify for certain results. Here's a little book that tells just the things you want to know.

You do the builders you serve and yourself a favor, when you specify

Lowe Brothers High Standard LIQUID·PAINT

It has the quality that *insures best results.* It is *scientifically* made from selected materials according to formulae that a third of a century's testing and experience have proven weather-worthy. It withstands the elements for years, holds its color, resists sun, rain and frost, and leaves a good surface for repainting.

Write today for this book of specifications, and for "Paint and Painting"—a neat pocket education on the subject. You'll find these books of real help.

The Lowe Brothers Co.
518 E. Third St., Dayton, O.
Boston Jersey City Chicago
Kansas City Minneapolis

Lowe Brothers, Ltd.
Toronto, Can.

PAINT & PAINTING

Lowe Brothers HIGH STANDARD PAINT AND VARNISH SPECIFICATIONS

We Want Architects and Building Contractors

to acquaint themselves with our system of

Acetylene Lighting

We are manufacturers of the Jackson "Basement" and Michigan "Pit" Generators, the latter designed to be placed anywhere in the ground.

The most beautiful, simple and economical system of lighting in existence.

WANTED

We have some very productive territory open for some good, hustling representatives. Write for full particulars. Kindly state experience if any.

Night Commander Lighting Co.
Jackson, Michigan

the business has increased to such proportions that it is now manufacturing 18 different sizes of light contractors' equipment, six sizes of which are portable saw rigs. The plant is equipped with the most improved machinery and is ever increasing its capacity to make quick shipments. Every outfit is built complete in the company's own shop from engine up and embodies two vital elements: first, the equipment itself, its construction, design, power, economy and general service, and second, the facilities the company has to give service after the machine is placed in commission on the job.

The Kaustine Chemical Closet

For a number of years the problem of designing a closet which would instantly and effectively disinfect excreta has been discussed, and many solutions have been suggested. The closet illustrated in Fig. 7 is said to offer a practical solution for this problem. Two means have been suggested for the accomplishment of the desired result, namely: heat and chemicals. The heat treatment is, for many reasons, a difficult one, and the equipment here shown uses a chemical compound. As seen in the illustration, the tank is placed on the ground, or in the cellar underneath the closet. The bowl is located in as close proximity to the wall as possible, leaving sufficient space between wall and closet for a 4-in. vent pipe. The dip pipe is fastened to the bowl by small bolts and the bowl is fastened to the floor by screws. The 4-in. vent pipe is run inside the room as shown or to a convenient chimney connection. The vent pipe should extend at least 2 ft. above the peak of the roof. To charge the tank, one 35-lb. can of chemicals is dissolved in water and emptied into the tank. When the tank becomes filled it should be completely emptied by a pail, pump or drain cock. The chemical used in this equipment is handled in 35-lb. drums, which is said to be a sufficient quantity to charge the antiseptic tanks once. The apparatus here shown is made by the Kaustine Company, Inc., Dept. G, Buffalo, N. Y.

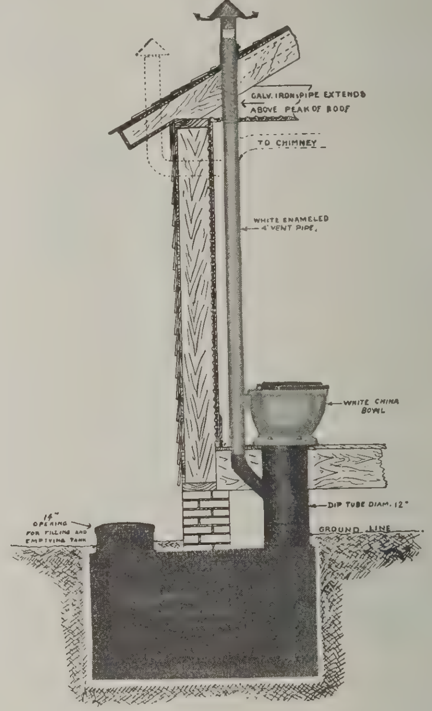

GALV. IRON PIPE EXTENDS ABOVE PEAK OF ROOF
TO CHIMNEY
WHITE ENAMELED 4" VENT PIPE.
WHITE CHINA BOWL
DIP TUBE DIAM. 12"
14" OPENING FOR FILLING AND EMPTYING TANK
GROUND LINE

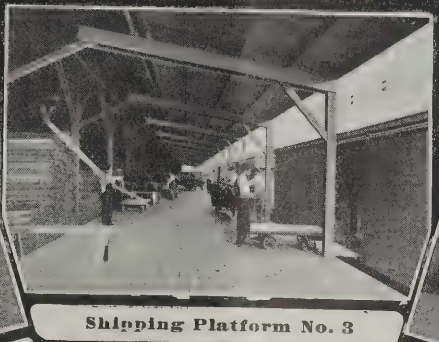
Fig. 7—Details of the Kaustine Chemical Closet

A Representative of the Beaver Board Companies Goes to South Africa

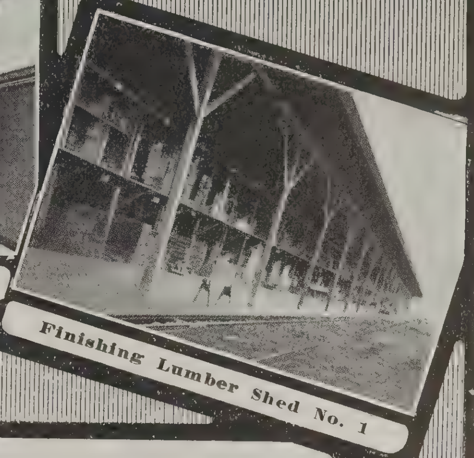
On the first of February of the current year R. S. Ward of the Beaver Board Companies sailed for South Africa, where the demand for the companies' product has increased to such an extent as to make the presence of a representative imperative. Mr. Ward is particularly fitted for his work, having first been a salesman for the Beaver Board Companies and later a distributor. He recently disposed of his jobbing business in Detroit to take up the new work. Beaver Board is

(*Continued on page* 88)

Loading Lumber on Track No. 3



Shipping Platform No. 3



Finishing Lumber Shed No. 1

1,000 TESTIMONIALS

From Contractors!!

And 18,000 Splendid Orders

More than 1000 contractors and carpenters testified in 12 months: "Gordon-Van Tine is Best."

Every letter was voluntary. Every one was unsolicited. Hundreds more thanked us for our quality and said we saved them big money.

Thousands of contractors and carpenters sent us orders from once to twenty times in the year. That is the test. Orders with cash are the final vote of approval.

Many of these customers have been buying of us for years. They have had time to test us out. And of course they have compared our **prices** and our **qualities** and our **service** with competitors of every kind at home and everywhere.

So 18,000 orders from the smartest, keenest judges of building material value means something to you.

Do As They Did!!

Write First For a 5,000 Bargain Catalog

Get an idea of Gordon-Van Tine **Prices.** Get an idea of the scope of a 5,000 Bargain stock. See how many things can be shipped **at once.** See how little freight costs. Then remember Gordon-Van Tine guarantee prompt shipment, safe delivery and satisfaction, no matter where you live.

Write for that catalog—that price guide. Then try a test order. See why there were 1,000 testimonials and 18,000 orders from contractors and carpenters last year.

Quick Action On Your Spring Orders!!

Gordon-Van Tine Co.,
Davenport, Iowa, U. S. A.

Dear Sirs: My order No. 64569 has arrived all in good shape. I am glad this material came along so well for I was needing some of it.

I am sending you another order now which I hope will come along as well and be of the same good material as the rest have been. I have had more real satisfaction with your finishing material than any I have ever used. It is a pleasure to look at a job after it is finished with it. Every house I build advertises your material.

In my order I have 10 pieces 1x12-10 dressed to ½ inch. If you send me the cost of dressing this I will send it with my next order. Yours truly,

Jos. J. Lynn (Contractor),
Moose Jaw, Sask., Canada.

Gordon-Van Tine Co.,
Davenport, Iowa.

Gentlemen: I have been dealing for quite a while with you and have always found your material all of first quality. I used some doors here a few days ago that was bought from a local dealer and today I had to take them down and glue them up again—a very unpleasant job. The owner asked me what he had best do about it. I told him to buy of Gordon-Van Tine after this. None of your work has required that in the ten years I have been dealing with you, and a number of them have not been painted as they should have been.

Your well pleased customer,
S. T. Hibbs (Carpenter),
Monticello, Utah.

Gordon-Van Tine Co.,
Davenport, Iowa.

Gentlemen: I am more than pleased the way you people have treated me. Your millwork has been far ahead of expectations. Customers are pleased. Will send another order the last of the week, then will close work until spring.

Will close, hoping you a prosperous year.

Yours respectfully,
W. D. Lyle, Contractor,
Route No. 1, Hallton, Pa.

Gordon-Van Tine Co.,
Davenport, Iowa.

Dear Sirs: The door and window frames came through all right. Am well pleased with them and your prompt shipment for which accept thanks.

Yours truly,
W. C. Beidler (Contractor),
R. No. 6, Box 7, Freeport, Ill.

Gordon-Van Tine Co.,
Davenport, Iowa.

Dear Sirs: Goods under order No. 61819 arrived Jan. 2d. Everything came through without a scratch and I am highly pleased with the goods. Nothing better has ever been shown in this town, and if I have occasion to build again you will certainly get the bill. Yours truly,

John F. Albrecht.
Glencoe, Minn.

The Gordon-Van Tine Co.,
Davenport, Iowa.

Gentlemen: With reference to your favor of the 21st, will say I am more than pleased with my shipment of lumber and roofing. I find that by placing this order with your establishment I have saved $50.00 on a barn bill. The grade is by far better than is handled by our local dealer and the price is so cheap in accordance to what one would have to pay a local dealer, that I am surprised when I see men losing money by patronizing a local dealer.

Yours very truly,
W. A. Wilson,
Contractor and Builder.
Birmingham, Iowa.

Gordon-Van Tine Co.,
Davenport, Iowa.

Dear Sirs: The bill of goods ordered for Clifford Litman arrived all O. K. Will say that we are more than pleased as the goods are better than we expected and we figure that we saved at least 40% on this order. You can depend on getting several orders from this section in the near future as I shall use my influence to divert business to you. Yours very truly,

C. H. Lehew,
L. B. 236, New Martinsville, W. Va.

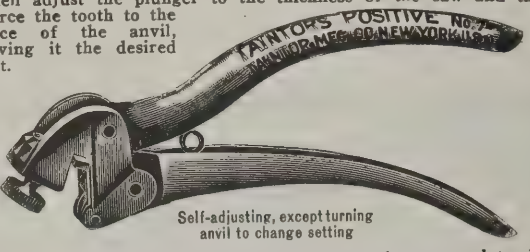
Gordon-Van Tine Co.,
Davenport, Iowa.

Dear Sirs: I will say for the benefit of those who may be contemplating ordering lumber and millwork of you that I am well pleased with everything ordered from Gordon-Van Tine Co. Lumber and millwork has been best of quality all through. Prices are 20 to 50% lower than local-dealer prices. And as to business quality, they do strictly straight, honest and reliable business, ready to make things right.

Yours truly, H. D. Hanna,
Contractor and Builder.
Larned, Kans.

GORDON-VAN TINE CO.

691 FEDERAL ST. DAVENPORT, IOWA


TAINTOR'S POSITIVE No. 7
TAINTOR MFG. CO. NEW YORK U.S.

DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.

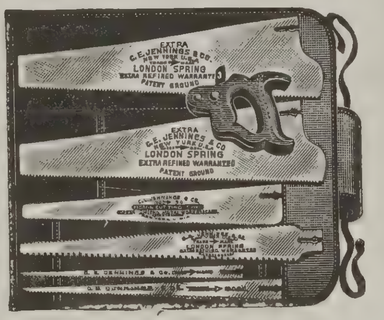
Self-adjusting, except turning anvil to change setting

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.

Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., **New York**



C. E. Jennings Arrow Head Combination Sets of SAWS

Adjustable Handle

The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set In a Box or Leather Case If So ordered Extra. We will send a set by parcel post if your dealer cannot supply you.

Send for circular.

No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

Sole Manf's

C. E. JENNINGS & CO., 71-73 Murray St., New York

REYNOLDS ASPHALT SHINGLES

Guaranteed for 10 years—will last many years longer

Natural colors of garnet, red, gray and green, which never fade.

We are the ORIGINAL MAKERS of Flexible Asphalt Slate Shingles and tested our product for ten years before putting it on the market. Let us send you a booklet.

H. M. REYNOLDS ASPHALT SHINGLE CO.

West Grant St. Grand Rapids, Mich.
Established 1868

already well known in South Africa, where it is used with great success throughout the colonies. Mr. Ward will therefore go not only to establish new dealers, but to work with those already handling pure wood fiber Beaver Board. It is interesting to note in this connection that the Beaver Board Companies have representatives in South America, Australia and Mexico, as well as a branch office in London.

A New Covering for Roofs and Floors

The attention of architects, builders and property owners generally is being directed to a form of covering for roofs and floors known as "Con-Ser-Tex," made by William L. Barrell Company, 8 Thomas street, New York City. It is of such a nature that the fiber is proof against mildew, while a scientific chemical treatment renders it rot-proof. The canvas is said to be so treated that the destructive action of oil and paint is eliminated. It lays flat upon the surface to be covered, is neat in appearance, and is guaranteed by the company against splitting, buckling or bulging. Another point which is strongly emphasized is its waterproof qualities, it being impervious to water and non-absorbent as to the sun's rays. It also deadens the noise of the rain and stops the rattle of the wind because it clings tight to the floor or roof surfaces. The maker states that its resilient qualities enable it to withstand the scuffling of feet, the shifting of porch furniture, and the wear and tear of brooms and mops in a most satisfactory manner. The Chicago distributors of the material are George B. Carpenter & Co., Wells and Michigan streets, and the California distributors are Waterhouse & Price Co., San Francisco.

Convention of Disston Salesmen

In line with the progressive policy always followed by this firm, Henry Disston & Sons held their semi-annual school and get-together meeting of salesmen during the week of January 5 of the present year.

The underlying motive for these meetings is the desire to make the men who sell Disston Brand Goods not only better acquainted with the manufacture of the goods they handle, but better acquainted with each other as well. An interchange of ideas and experiences between the representatives of a big business is always conducive to a finer corps spirit among the men, and consequently larger interest in the success of the line represented.

This meeting embraced all those members of the Eastern sales force who could attend. Owing to important matters which they had in hand a number of men were unable to leave their work, but there was enough enthusiasm among those present to make up for any absentees.

While new goods were shown and demonstrated, and the superintendents of the various departments where they were made gave the salesmen much valuable information about their manufacture, the salesmen also made frequent trips through the factory viewing new machines and methods intended to increase the quality and efficiency of Disston Brand Goods. These were shown and explained to the salesmen so that they could keep abreast of the progress constantly being made in the factory.

The meetings, held daily throughout the week, were addressed by a number of speakers as well as various members of the sales force. The convention proved a big success, and the men started out again with increased confidence in the quality of the Disston products, and full of that spirit which recognizes no obstacles, but sweeps the men, and the goods they sell, onward to success.

Unit Sash Balances

The idea of a spring sash balance as distinguished from a balance by means of a counterweight has been applied in the construction of windows for a number of years, and that style bearing the trade name of "Pullman," and made by the Pullman Mfg. Company, Rochester, N. Y., has become well known to the trade. There has been one objection, however, to this form of equipment which was due, not to the principle

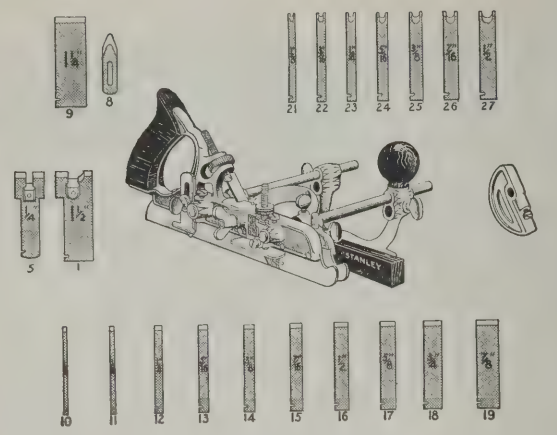
(*Continued on page 90*)

Corbin Glass Knobs

with Corbin Hardware are like brilliant jewels in fine settings, and give beauty and elegance without ornate ornament. They are in favor for fine homes, used either with key plates as illustrated or with long escutcheons of Colonial designs.

The best hardware dealers sell them. Circular HK87 shows the full assortment. Send for it.

P. & F. CORBIN
Division
The American Hardware Corporation
NEW BRITAIN, CONNECTICUT
P. & F. Corbin of Chicago P. & F. Corbin of New York P. & F. Corbin Division, Philadelphia



Stanley "Forty-Five"

Seven Tools in One

1.—Beading and Centre Beading Plane. 2.—Rabbet and Filletster Plane. 3.—Dado Plane. 4.—Plow Plane. 5.—Matching Plane. 6.—Sash Plane. 7.—Superior Slitting Plane.

With each Plane are furnished twenty-one cutters, all of which are shown in the cut.

The Plane, together with the 21 cutters, is packed in a neat substantial box.

Send for Catalogue No. 34E, containing complete description.

—ADDRESS—

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

THE WORLD IS OUR MARKET
DISSTON
SAWS, TOOLS, FILES, CRUCIBLE STEEL

Reg. U. S. Pat. Off.

You—the Man Who Does the Work

You may think that your skill and experience supply much that is lacking in the way of efficiency when you buy a poor tool, but why struggle with an inferior tool when it is possible to get the best by specifying DISSTON to your hardware dealer?

Your father told you of the quality that went with Disston Saws. You have discovered it for yourself. Do you know that this same quality distinguishes a long line of other Disston Tools? Keep your saws sharp with Disston Files. These, and all the other DISSTON BRAND GOODS, are obtainable at all hardware stores.

Our book on how to *properly* file a saw also tells you other things about tools. Send for it—free to you.

Henry Disston & Sons, Inc.
Keystone Saw, Tool, Steel and File Works

Philadelphia, U. S. A.

of spring counterbalance itself, but to the fact that, owing to the variety of sizes of face plates in which this equipment was furnished, the mortises for the plates could not be made at the mill, and it was necessary to fit them on the job by hand mortising. The new unit balance manufactured by this company eliminates this objection by the utilization of a standardized face plate, thus making possible the cutting of the mortises at the mill the same as for ordinary sash pulleys. The Pullman "Unit sash balance" consists of six parts and one-half the case forms a revolving drum. Inside of this drum is a coiled spring of proper strength to support the sash, and several times the length of the window run. The latter construction is intended to insure uniform tension, thus making possible the balancing of the sash at any desired point. Outside of the drum is wound the bronze tape, which supports the sash. This tape is kept under tension by the spring inside. The Pullman Mfg. Company has recently issued a new catalogue under the number, "20," which may be had on application. A booklet is sent with the catalogue which contains a number of half-tone cuts illustrating residences and other structures in which this form of sash counterbalance has been employed.

The "Big-an-Litle" Concrete Mixer

The average builder desires a concrete mixer which is easily portable, and, at the same time, may be depended upon to produce a sufficient amount of well-mixed concrete to handle the average job. The manufacturers of the "Big-an-Litle" concrete mixer have aimed to produce an outfit which would meet this demand for a machine of medium size. Attention is called to the fact that the working principle of the machine is simple and that there are no complicated parts to cause trouble. The material is loaded at one side of the machine and discharged from the other. The mixer drum is not stopped during the operation of loading, a feature which results in a saving of power and time. The machine shown in Fig. 8 represents the 1914 model as made by the Yaeger Machine Company, 216 West Rich street, Columbus, Ohio. An interesting display of the machine was made at the Chicago Cement Show, February 12 to 21 of the present year.

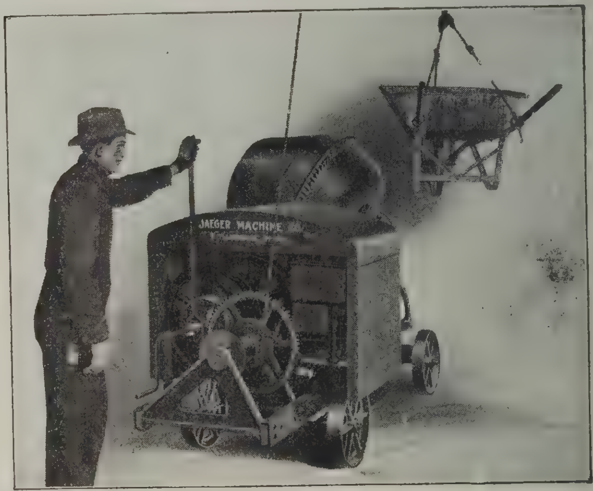


Fig. 8—The Yaeger "Big-an-Litle" Concrete Mixer

Metal Weather Strips at Reduced Cost

A new method of distributing metal weather strips which promise to greatly reduce their cost to the consumer and which opens a profitable field for the contractor has been inaugurated by the Durametal Weather Strip Company, 825 Washington street, Chicago, Ill. By means of the new system it is possible for any one to buy this material by the foot and either install it himself or have the work done by a contractor in his own town. In this way the selling expense is reduced so that now this important modern improvement is placed within the reach of home owners in all parts of the country. The Durametal weather strips are made entirely of zinc or bronze and are installed in such a

(*Continued on page 92*)

EVANS RING JOINT—PATENTED
SHOWING REVERSE SIDE THEY CANNOT OPEN

OUR EQUIPMENT WILL SAVE YOU MONEY

INDIANA OAK OR ANY WOOD SPECIFIED

WRITE FOR CATALOG "GET INTO THE RING"
it tells about this Joint—it has four tons elastic pressure

Carnahan Manufacturing Company
211 Mill St., Loogootee, Indiana
Mill Work Specialists

We make Evans Process Sanitary Doors

Standard Veneered Doors

Stock Doors

Doors to Detail

Interior Trim

Stairs

Exterior Mill Work

Oak-Beach and Ash Flooring Thick or Thin

Our stock is large giving prompt service

Catalog 110 of Standard Doors and Mill Work

Finish Assembled with Evans Ring Joints

Sanitary and Standard Doors always in stock

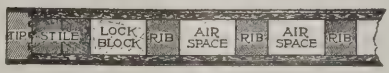
Estimates made from lists or complete plans accompanied with details

High Grade Artistic Product

We claim the largest and best equipped plant in Indiana for special mill work

Catalog 111 of Evans Hollow Sanitary Door

EVANS PROCESS—PATENTED



Made with 1/8 inch Veneers
THEY NEVER GO WRONG

The Evans Hollow Sanitary Door will not shrink or swell in length or breath, it will not warp or cup. 1 3/4 inch doors weigh but 3 1/2 lbs. per square foot, or one-half of a solid door. One man can hang it, this saves 3 cents per square foot labor. The veneers stay tight. It is sold under 1 year guarantee. It is as sound proof as a hollow partition. Evans Ring Joint for mitered casings and miters of all kinds. It is also used for square joints. Panel work and entire sets of casings can be put together with this joint. The rings are made of corrugated tempered steel and forced over a cone until they form a true circle and are pushed into the groove with heavy pressure. Joints held in this way can never open.

WRITE FOR CATALOGS AND PRICES

WE HAVE A PLANT FAR AHEAD OF THE TIMES

Straight Talks on Durametal Weatherstrips

¶ You contractors—carpenters and building owners—why not buy weatherstrips direct from the manufacturer and do your own installing?

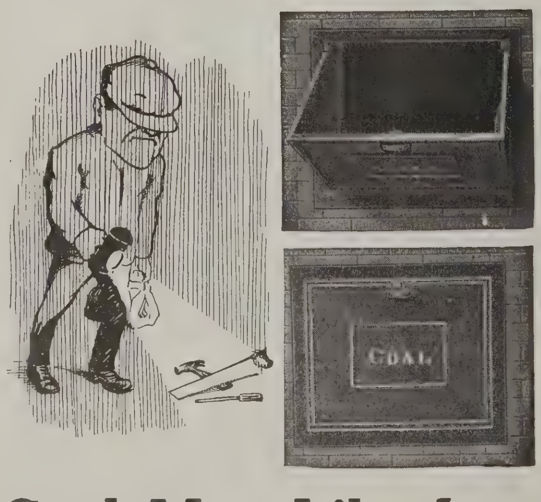
¶ By our unique plan, we have cut out the usual big selling expenses, which enables you to buy direct from us, make a profit on the strip and good money on the installation besides.

¶ Durametal Weatherstrips have been successfully sold for over 10 years, and have stood every possible test. Their durability and simplicity make them superior to all others.

¶ Made of best heavy zinc, and fully guaranteed. Write for samples and prices now before you turn another page. There's money in this for YOU.

A few agencies open to responsible, live, local contractors and carpenters.

Durametal Weatherstrip Co.
825 W. Washington Blvd., CHICAGO, ILL.



Coal Men Like It—Burglars Don't

The "Canton" Coal Chute protects the house from damage when coal is put in, and protects the cellar from being entered from the outside.

The "Canton" locks from the inside, outside, or both sides. Neat, convenient, durable. Specify it when planning your house. Send for Catalogue "B-6."

Canton Foundry & Machine Co.
Canton, Ohio

way that they last as long as the building itself. The claim is made that they keep out the dust and cold drafts which sift in around the windows and doors and thus greatly reduce the cost of heating and house cleaning, besides preventing the windows from rattling. They slide smoothly and easily and add much comfort to the home in winter. Another point which is emphasized is that they do not disfigure the woodwork of the finest residences. Any carpenter or handy man can soon learn to install them quickly and a profitable season's business may be secured by taking contracts for the work. On sliding windows the strips have a projecting rib or flange of heavy zinc which fits into a groove cut into the edge of the sash on the top, bottom and sides. The meeting rails are equipped with two interlocking zinc strips so that there is no chance for the wind or dust to enter at any point. The claim is made that the strips do not interfere with the removal of the sash for the purpose of fixing broken sash cords or to make other repairs.

For doors and for casement or hinged windows highly tempered spring bronze is used, a narrow strip being placed in the crevice between the door and the door frame so that it cushions against the edge of the door when it is closed. An attractive booklet illustrating and describing the Durametal weather strips and the method of installation has been issued by the company and a copy of it can be secured by any reader of the paper who may be interested.

A Chisel Offer to Carpenters

Every up-to-date and progressive carpenter realizes that in order to do good work it is necessary for him to possess first-class tools and also to keep them keen of edge. In the line of chisels, of which he makes use of quite a variety, he naturally wants the best, and is therefore interested in those which are claimed to fulfill satisfactorily every requirement of a tool of this kind. Among these are the product of the L. & I. J. White Company, 100 Perry Street, Buffalo, N. Y., and concerning which the manufacturer makes a most interesting offer to carpenters and especially to those who have never used White's chisels and possibly cannot get them from their dealer. The company offers to send for $4 parcel post paid to any point in the United States, the set of six chisels and one screwdriver with leather tip handles in canvas roll as shown in Fig. 9. These are said to represent the very best chisels turned out by the company and the offer is made so that every good carpenter may demonstrate for himself the merits of these chisels and compare them with others which he may have used in the course of his work.

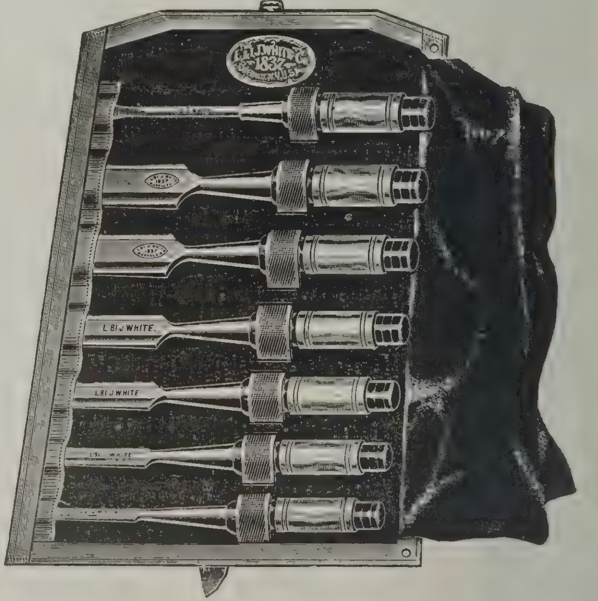
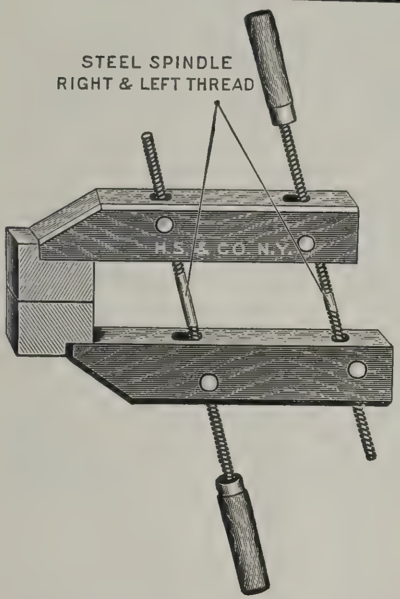


Fig. 9—Case of Chisels as Offered to Carpenters

(Continued on page 94)



HERE IT IS!

AN ADJUSTABLE (Jorgensen Patent) HAND SCREW

LOOK AT THE PICTURE!

The steel spindles work in steel sockets that permit of swivel movement while the jaws are ***absolutely*** rigid when tightened.

There are almost hundreds of positions possible, making the Jorgensen Screw superior to the old style by this immense advantage.

Send for Special Circular No. 3154 and be convinced

HAMMACHER, SCHLEMMER & CO.
HARDWARE, TOOLS AND SUPPLIES
New York, Since 1848 **4th Ave. and 13th St.**

SARGENT

OUR new Rafter Square, No. 500R, is the most complete Square ever made for the carpenter.

It contains accurate measurements for all kinds of rafters, common, hip, valley, jack and cripple—in the most convenient form.

These measurements are all given on the Square; they are complete, correct and final. They save the trouble of multiplying and dividing and then obtaining a result about which there is some doubt.

Simple and easy to use. A great time saver.

For full description and directions for using send for the Sargent Square booklet, free on request.

SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application.

Something For You

in our Pamphlet 29; viz: Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and a Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

Berger's

Metal Lumber

the only fire-proof material to universally take the place of wood timber. Similar to structural steel but lighter. Replaces wood stick for stick. *Write for Catalog.*

The Berger Mfg. Co., Canton, Ohio

For the best service address nearest branch

New York · Boston · Minneapolis
St. Louis · San Francisco · Philadelphia

Better Than Corner Boards

Kees Metal Building Corners are supplanting corner boards. Better, neater job; quicker, cheaper. You get the popular mitre corner effect without the slow work of cutting bevels.

Write today for free samples and full particulars.

F.D. KEES MFG. CO. BEATRICE, NEB.
Box 812

If you have never used Gossett Window Screen Hangers ask for samples. They're free.

Why Take a Chance

of having a defective wall from using a scrap wall tie in varying thickness as light as tin.

Ask your dealer the weight of a box containing 1000 ties and if the weight is below 50 pounds you are buying an inferior tie and entitled to rebate.

To be safe, specify the

Whale Bone Wall Tie

and if your dealer cannot supply same, order direct from us and we will ship the same day as received, at price of $2.50 per 1000 Pittsburgh, Pa.

ALLEGHENY STEEL BAND COMPANY
BELL PHONE: 718 Cedar North Side, PITTSBURGH, PA.

Kellastone Co. Reorganized

The National Kellastone Co., with offices 507 and 508 No. 19 South La Salle Street, purchased all of the manufacturing plants, assets and physical properties at Argo and Alton, Ill., and Muskogee, Okla., formerly owned by the U. S. Kellastone Co. recently declared bankrupt. The new company has been organized to resume the manufacture of Kellastone, but its selling and distributing policies will differ radically from those of the former company. Kellastone is now made up of only the very purest of raw materials, carefully tested, and great care is exercised in every detail of its manufacture, thus insuring continuous uniformity in both strength and color.

The Hunter Stair Routing Machine

Stairbuilders as well as building mechanics who are occasionally called upon to execute stair work are likely to be interested in the routing machine illustrated in Fig. 10 of the engravings. It has been brought out to meet the demand for a cheap and substantial machine that would do the work of the higher priced power routers, and in this the manufacturer feels that he has succeeded. The claim is made that it will do the work eight times as fast as by hand and that any one of ordinary strength can cut the gain for a stair tread 10 in. wide at the rate of two per minute and move the plank from one tread to the other. It is only necessary to lay out one tread and rise, then step along the edge of the plank, make a mark and the machine lays out the rest as it will stop at any desired width or depth. The stand or support for the router is made by using two pieces of 2 x 4 in. stuff and 6 ft. long as indicated at 1 in the illustration, then nail on to them two planks 1¼ x 10 in. and 5 ft. long as shown by 2 in the picture. The wall string is indicated by 3 and this rests on a 1 x 1 in. strip shown by 4. The groove, 5, in the plank at the bottom where the lip on clamp, 7, engages to keep the machine from dropping from the stand while changing from one angle to another. The body of the router is of malleable iron and inside are six cast steel gears, machine cut, all running on roller bearings. There are two steel tubes, 17, on which the router slides up and down, while doing the work. The lower end is screwed into the separator at 9, while the upper end slides through the separator 8 in order to allow the clamp to stay on the edge of the plank while changing from one angle to another. The dotted line shows that the router can be instantly moved to any angle. A ferrule with set screw is used to stop the router at any point. On the shaft is a fly wheel that drives the cutter, a thumb screw being used to adjust the depth of gain. The handle of the machine is made of cast iron. As the router is self-feeding it is always in position as shown in the illustration, hence it always has a tendency to slide down the polished steel tubes, thereby feeding itself. If too fast in pine it can be held back with the handle, 14. The router operates in hardwood as well as soft and will cut gains in window and door jambs, store shelving, etc. It is made by the Hunter-Forrester Company, 7336 Hermitage Street, Pittsburgh, Pa.

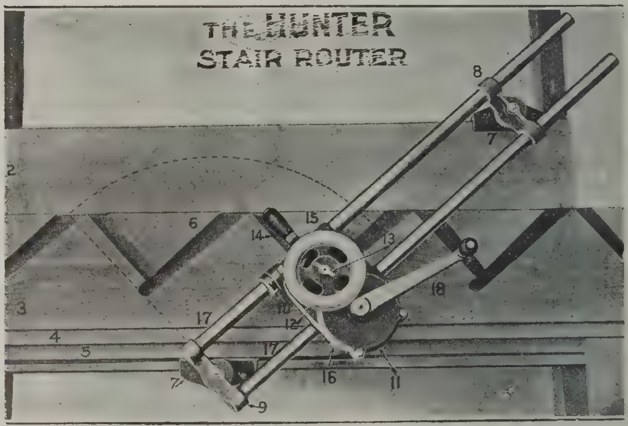


Fig. 10—Showing Application of the Hunter Stair Router

(*Continued on page 96*)

Established 1837

77 Years' Experience

Set R-2

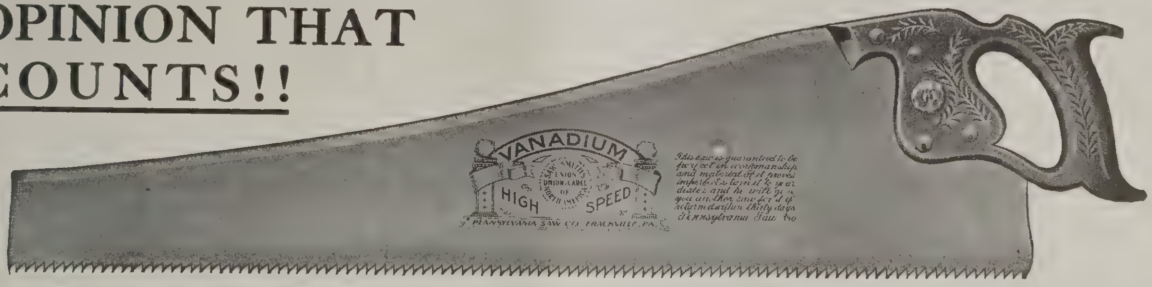
Special Offer

We realize there are many A1 carpenters who want to get the best chisel they can and who have never used WHITE'S and cannot get them from their dealer. To these carpenters we are going to make a special offer. We will send parcel post paid to any point in the U. S. this set of 6 chisels and 1 screwdriver, leather tip handles, canvas roll—our very best chisels, for $4.00—a saving of about 20%. Regular price $4.85 Buffalo, postage not paid. We will not duplicate any orders—all orders later must come through your dealer. The above offer is made so that every good carpenter can see for himself how much superior our chisels are to the so-called "good" chisels. If we have a dealer in your town, we will ship the set through him, if not, we will ship it to you direct.

Do not delay. Send Today. We Guarantee Satisfaction.

The L. & I. J. White Company, 100 Perry Street, Buffalo, N. Y.

IT'S THE MECHANIC'S OPINION THAT COUNTS!!



Straight or Skew Back, in Hand, Panel, Ship Carpenter or Rip, Any Teeth Desired. All Sizes.

The Vanadium High Speed Guaranteed Hand Saw

It retains a keen cutting edge at least five times as long as a saw made from any other steel—and that means five times the service.

The steel in this saw is very close, tough and ductile and can be perfectly tempered. This insures against chance of kinking or fracturing the teeth while setting and gives permanency to the cutting edge.

WE CHALLENGE THE WORLD TO PRODUCE ITS EQUAL!

———, Iowa, Nov. 10th, 1913.

PENNSYLVANIA SAW CO.:

You will note on the other side of this sheet that I wrote you in August regarding your VANADIUM SAWS. I have concluded to try a set of them. As I am the leading mechanic of this locality I may be the means of selling a number of them here. You may send me—1 Rip Saw, 30 inches long, 5 point; 1 26-inch Hand Saw, 7 point; 1 22-in. Hand or Panel Saw, 9 points to the inch. All of these saws I want Skew Back style. I have been using ——— Saws for 20 years. If you want to send these saws by parcels post to me so I can examine them, and if they are satisfactory, I will send you the price for them. As to my responsibility, I refer you to the ——— Bank, ——— Iowa.

Through an error we sent him 5 saws, instead of 3. Below is his reply:

———, Iowa, Jan. 5, 1914.

PENNSYLVANIA SAW CO.:

On the reverse side of this sheet you will note that I owe you $9.45. Enclosed you will find same. I am well pleased with the saws. **I think they are the best saws made.**

If your dealer cannot supply you, will send them anywhere by Parcel Post.

PENNSYLVANIA SAW COMPANY - SALES OFFICE, BETZ BLDG., PHILA., PA.
FACTORY, FRACKVILLE, PA.

Free to Builders

A Paine Toggle Bolt Or Expansion Shell

There is no better way to determine the grip and holding power of our Toggle Bolts and Expansion Shells than to try them. Both are *new* and *different* from all others.

Tell us the sizes required and we will send you Free Samples of each. We will also mail Special Literature which describes them fully. Send NOW, before you forget it.

THE PAINE CO.
1376 Corn Exchange Building, Chicago

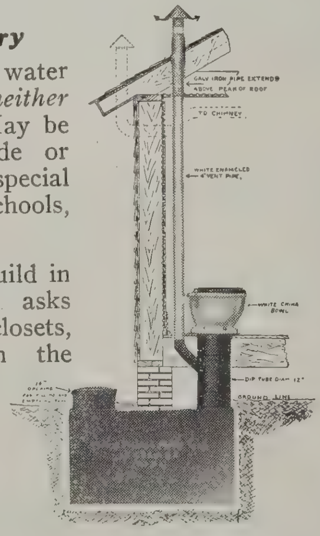
The KAUSTINE
Chemical Closet

Is to rural and suburban homes what the sewered water closet is to the city home. Equally satisfactory for schools, factories, churches, stores, parks, etc.

Simple—Sanitary

Looks like a sewered water closet but *requires neither water nor sewer.* May be installed either inside or outside. We make special battery systems for schools, factories, parks, etc.

If a man about to build in a sewerless district asks your advice about closets, recommend to him the Kaustine System — the cheapest, simplest and most satisfactory system. Guaranteed odorless and sanitary.


GALV. IRON PIPE EXTENDS ABOVE PEAK OF ROOF
TO CHIMNEY
WHITE ENAMELED 4" VENT PIPE.
WHITE CHINA BOWL
DIP TUBE DIAM. 12"
GROUND LINE

We want reliable carpenters, dealers and agents in all sections to represent us. Special proposition installing first system, then good profit on future orders. Write for booklet and agency now.

KAUSTINE CO., Inc., Dept. G, Buffalo, N.Y.

Kees Metal Building Corners

The attention of architects and builders is being directed to the metal building corners which are being introduced to the trade by the F. D. Kees Mfg. Company, Box 812, Beatrice, Neb. These corners are supplanting corner boards and are said to give a better and neater job, while being quicker and more economical. By means of these devices the builder secures the popular miter corner effect without the slow work of cutting bevels. We understand that free samples of these metal building corners will be sent to any architect or builder who may be sufficiently interested to make application for them. The company will also send samples of Gossett window screen hangers which are claimed to possess features which the architect and builder cannot afford to ignore.

S. C. Johnson & Sons Free Offer to Builders

The building season will soon be at hand and work is already being planned for active execution as soon as the weather permits. Contractors and builders are giving thought to supplies that will be required and in this connection they cannot fail to be interested in the free offer made by S. C. Johnson & Son, Racine, Wis. In order to give leading contractors an opportunity to test the merit of Johnson's wood finishes it is only necessary for them to present to their dealer in paints the certificate found in another part of this issue and he will furnish absolutely free half pint packages of Johnson's Wood Die, Under-lac and Flat Wood Finish. The point is made that these finishes are particularly adapted to the needs of contractors and builders as all the company's products dry quickly so that work can be finished in a minimum space of time. The Wood Dye is put up in glass bottles so that there is no possibility of chemical changes.

The Yankee Compound Level

An instrument which the builder, the mason, the landscape artist and even the architect finds of interest in connection with his work is the Yankee Compound Level, offered by the Frost-Adams Company, 37 Cornhill, Boston, Mass. The device is of such a nature as to also prove of great benefit as an auxiliary to the engineers transit. It has among other features a 10-in. erecting telescope of 12-in. diameter power with ground and graduated level attached held by a swivel, forming the horizontal axis around which revolves the vertical arc of 1½-in. radius. This arc is divided to single degrees and read by an index line placed on the standards. A rigid double standard carries the upper element and between this and the vertical center is held a plate of 3½ in. diameter upon which the vernier is engraved, giving a reading of five minutes on horizontal angles. The horizontal circle is cast solid with the leveling head. There are four leveling screws provided, also large diameter foot plate and a substantial yet graceful tripod head. The materials and workmanship are of a high order and the moderate cost at which the instrument is offered was attained by eliminating complex features while retaining all the elementary principles.

Practical Home Building

Many of our readers will doubtless be interested in an attractive publication entitled "Practical Home Building" which has just been issued from the press by the Northwestern Expanded Metal Co., 904 Old Colony Building, Chicago, Ill. The matter consists of illustrations of a number of dwelling houses finished with stucco exterior on expanded metal lath and in connection with many of them are floor plans together with brief comment and an indication of their cost. A few pages are devoted to porches and porch floors; others to "over coated" houses, while stucco garages are not without mention. Much is presented in regard to the metal lath manufactured by the company and there are figures showing the difference in cost between the usual wood type of house and the stucco and metal lath combination. The little work has been prepared by C. O. Powell, structural engineer, and the price is 10 cents.

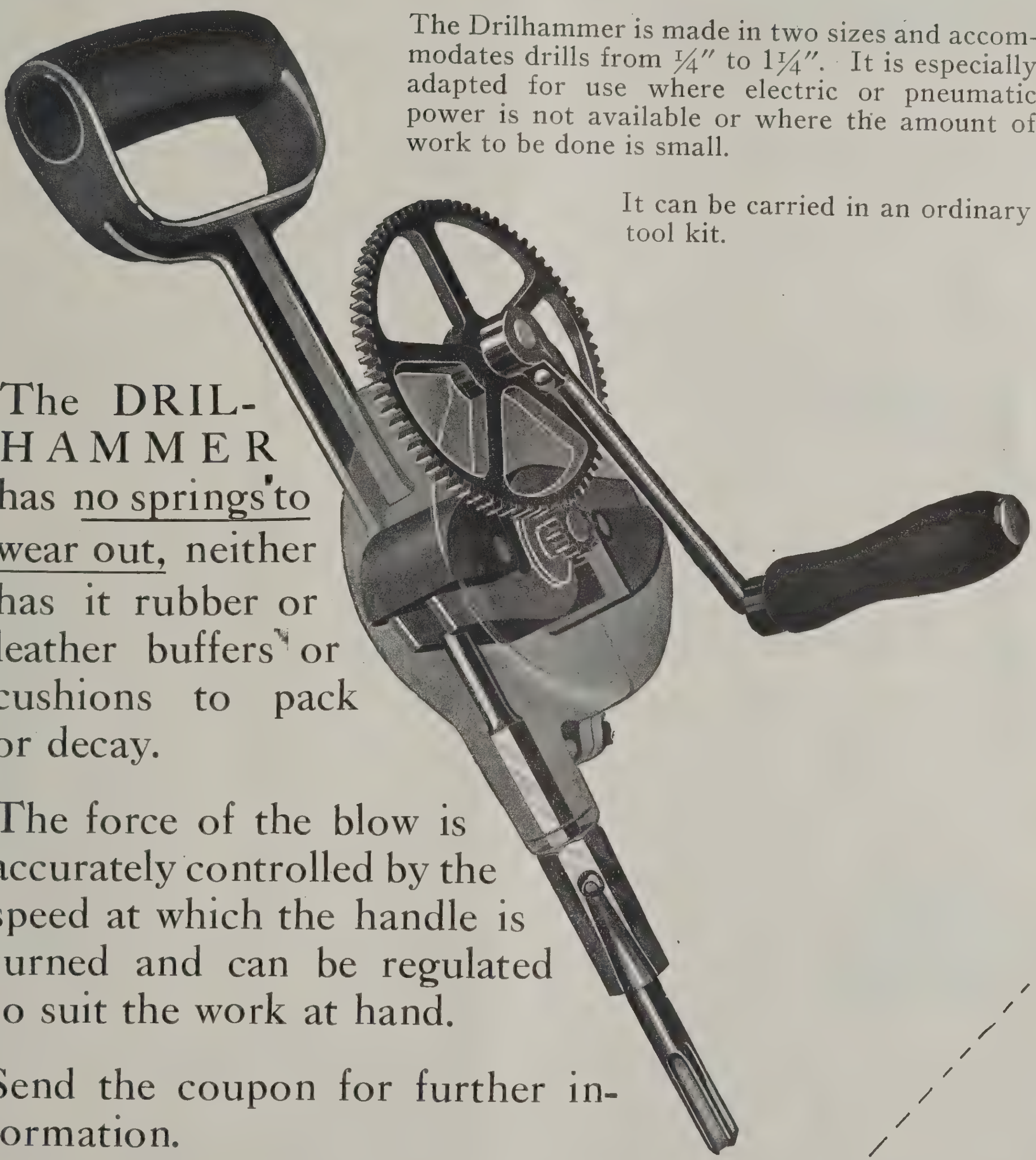
(*Continued on page* 98)

Wherever you have any drilling to do, whether in concrete, stone, brick, marble, etc., in walls, floors, ceilings, corners—use the

DRILHAMMER

The Drilhammer is made in two sizes and accommodates drills from ¼″ to 1¼″. It is especially adapted for use where electric or pneumatic power is not available or where the amount of work to be done is small.

It can be carried in an ordinary tool kit.



The DRILHAMMER has no springs to wear out, neither has it rubber or leather buffers or cushions to pack or decay.

The force of the blow is accurately controlled by the speed at which the handle is turned and can be regulated to suit the work at hand.

Send the coupon for further information.

ORR & LOCKETT HARDWARE CO.

Established 1872

14-16 W. Randolph Street, Chicago
401 Broome St., New York

COUPON

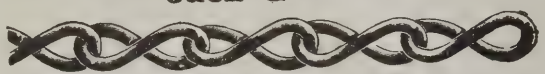
Orr & Lockett Hardware Company,
14-16 West Randolph St., Chicago
401 Broome St., New York
Tell me all about the Drilhammer.
Name............................
Address............................

The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.

Sash Chains

Cable Chains

Jack Chains



Manufacturers of "GIANT METAL" Sash Chains

Manufacturers of "RED METAL" Sash Chains, Cable Chains, Jack Chains, Bell Hangers' Chains and Plumbers' Chains. Made in Brass, Copper and Steel.

WRITE FOR CATALOGUES AND PRICES.

We are the ORIGINATORS of SASH CHAIN as SUBSTITUTE for sash cord. In use over thirty years. Capacity of our chain plant 30 miles per day.

Thomas Morton
245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion
SASH CHAINS
CHAINS
For Suspending Heavy Doors, Gates, Etc.
All of SUPERIOR QUALITY

Our House Design No. 10-Z.

$389 BUYS THE MATERIAL NEEDED TO BUILD THIS HOUSE!

Above price includes all first-class lumber; Clear Georgia Pine Interior Trim; Clear Siding; Flooring; and Shingles; Solid, standard construction. 3 rooms downstairs; 2 rooms with or without bath upstairs. Size of house 20 x 20 feet. Big returns as an investment. Blue prints free. We save you 33 to 50% on building material.

NO MONEY DOWN
We Save You 30 to 50 per cent.
Ask for Free Book of Plans No. C.-V. 154

This handsomely illustrated volume cost us a fortune to produce, and contains more than 100 of the best designs of homes, barns and other buildings. Tells all about our Great Building Offer. Our prices on BRAND NEW material are lower than you can possibly obtain elsewhere.

WE MAKE PLANS TO ORDER

Our Architectural Department can help you develop your own building ideas. Send in your rough pencil plans and get our advice. We employ building experts who thoroughly understand their business.

15 to 20 Million Feet of New Lumber

constantly on hand at our Chicago yard. Large stock of High Grade Millwork, Hardware, Paint and other building material. Send us your list for low estimate. Plumbing and Heating Material at a 30 to 50 per cent saving. Write for low prices.

HARRIS BROTHERS COMPANY
35th and Iron Streets CHICAGO

Denison Blocks in California

"Denison" hollow building blocks, which have been in use for some time in Oregon and Washington, are to be introduced in the California markets by the California Denison Block Company, which has opened offices at 401-403 Monadnock building, San Francisco. This will be the central headquarters for the sale of this material west of Denver, the local office being under the management of H. R. Kreitzer, while Fred W. Eastman has charge of the Western territory. Arrangements have been made for the manufacture of this material for northern California by the Carquinez Brick & Tile Company, San Francisco, and the Sacramento Clay Products Company, Sacramento, Cal.

TRADE NOTES

Original Gas Engine Company, Lansing, Mich., calls the attention of those operating woodworking establishments in which more or less of the equipment is driven by power to the Ideal Gas engines, which are adapted for every purpose. The point is made that the Ideal is a compact simple engine requiring no skilled labor for operating; that it has self-oiling boxes, large valves, enclosed crank case and can be equipped with Magneto if desired. Contracting builders desiring complete outfits can secure a copy of Catalogue No. 314 which relates to them by addressing the company.

"Painting the Town with Dixon's" is the title of one of the illustrated articles in the last issue of "Graphite," published by the Joseph Dixon Crucible Company, Jersey City, N. J. The picture represents a view in the business section of Philadelphia and embraces four large buildings, the steel work of which was protected by Dixon's silica graphite paint. The issue in question contains the usual amount of interesting information relative to Graphite products.

"Up to a standard, not down to a price," is the initial line of a circular recently issued by the Bridgeport Wood Finishing Company, Box 104, New Milford, Conn., describing Wheeler's architectural varnishes. The claim is made that these varnishes are of superior quality and made from selected gum. They are manufactured by the same company which for years has produced Wheeler's wood fillers. A blank post card attached to the circular offers to send, on application, a booklet entitled: "Modern Wood Finishing," and issued by the company, which contains a great deal of interesting information relative to the subject indicated.

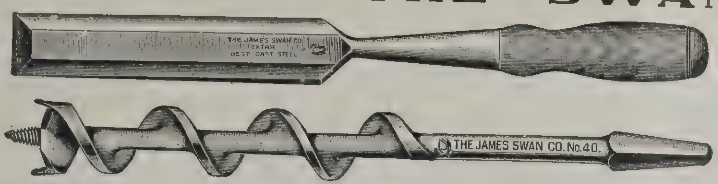
The various processes for making warm air registers from cast iron in the factories of the United States Register Company, Battle Creek, Mich., have been recently supplanted by the installation of modern machinery for their future manufacture from stamped steel. When the equipment is completed the factory will have a capacity for turning out something like 1500 registers per day which will enable the company to fill orders on shorter notice than heretofore and on a more efficient and economical basis.

We have just received from the Flintkote Mfg. Company, Boston, Mass., a sample of "Zolium" Diamond Tile Roofing which was recently taken from a roof in Rochester, N. Y., that was laid nine years ago, the building being torn down to make way for another structure. The sample measures 2 x 3 in. in area and presents a rich coppery red appearance very much like Spanish tile. It shows scarcely any evidence of wear and is an excellent demonstration of the serviceability of this type of roofing. It will be recalled that this company also manufactures Rex-tile Shingles which are made in two colors—red and slate—and are of such a nature that there is no warping, curling, twisting, splitting or turning up and therefore cannot flap in the wind. The 2-in. turn-under at the butt end is said to be that which does the trick.

The Simonds Mfg. Company, Fitchburg, Mass., recently opened an office at 209 Madison avenue, Memphis, Tenn., in order to take care of the growing business which has developed in that section of the

(*Continued on page* 100)

LOOK FOR THE "SWAN" TRADE MARK

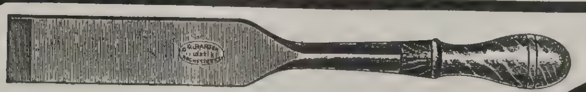

THE JAMES SWAN CO. No. 40.

On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.

MACK & CO.



The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

D.R. BARTON 1832 ROCHESTER N.Y.

Brown's Race
Rochester, N.Y.

"YANKEE" R & L. SPIRAL-RATCHET DRIVER
NORTH BROS. MFG. CO.
PHILADA PA. USA

You can now get this large "YANKEE"

with spring in the handle to drive it back quickly for the next push.

"YANKEE"
Quick Return
No. 131

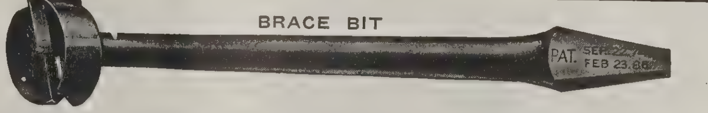
A quick and powerful tool for carpenters. Drives or draws most any wood screw in one tenth the time of an ordinary driver. Takes all the Yankee attachments.

Your dealer sells the "Yankee."

☞ *Send for the "Yankee" Tool Book anyway*

NORTH BROS. MFG. CO., Lehigh Ave., Philadelphia, Pa.

BRACE BIT

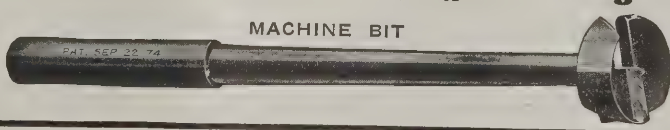


Bores any Arc of a Circle

Is guided by its circular rim instead of its center, and can be guided in any direction, regardless of grain or knots, leaving a true polished surface. Will bore a square hole. Unequalled for core boxes, delicate patterns, veneers, screen work, scalloping, newels, ribbon moulding and mortising.

THE PROGRESSIVE MFG. CO., Dept. "A" Torrington, Conn.

MACHINE BIT



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Our vest pocket edition for Carpenters, Plumbers and households; fitted with 4-inch Corundum Wheel. Weight 5 lbs.

Mr. Carpenter, just think for **$2.50** you can carry in your pocket a complete sharpening outfit. No dirt—no grease. If your dealer does not carry them, we will send prepaid on receipt of price. We also make six other sizes.

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227-233 W. Erie St., Chicago

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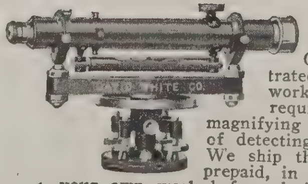
DAVID WHITE CO.

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Our No. 2011 improved level, illustrated herewith, is especially designed for work where a general purpose level is required. Telescope is 12" long with magnifying power 25 diameters and is capable of detecting an error of 1/16-inch in 300 ft. We ship this level out on approval, express prepaid, in order that you may try it out on your own work before deciding to keep it. Ask today for your circular X and special net price sheet. Ask today!

DAVID WHITE COMPANY
Dept. B, 419 E. Water Street Milwaukee, Wis.

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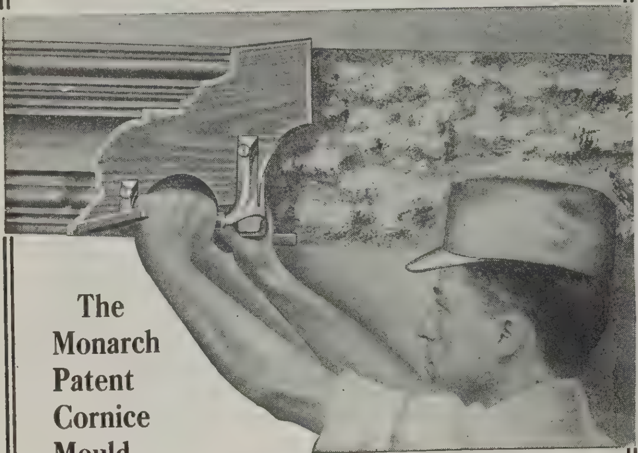


The Monarch Patent Cornice Mould

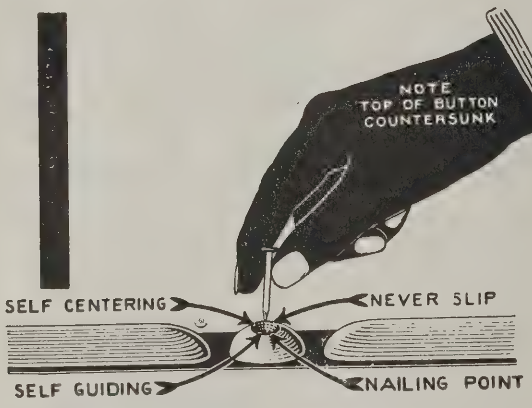
consists of a blade holder, ten assorted blades, and a brass blade scraper. This Mould has a wall and ceiling guide. Impossible to do a poor job. Frame is made of red birch and black cherry. Metal parts of aluminum—strong, light and non-rusting. Blades of zinc encased in white pine specially treated with oil to resist action of water and plaster.
The most expert hand-troweling cannot make as perfect plaster cornices and corners as the MONARCH CORNICE MOULD.
This tool will save you hours of time and hard labor. Makes the plasterer's work easy. A sure money-maker.

DON'T SPEND A CENT

Just send me your name and address. Tell me you want the Monarch Cornice Mould on *Ten Days' Free Trial.* Use it ten days and if it don't please you, send it back, that's all.

Get Your Cornice Mould Quickly by Writing Today

TIMOTHY F. HORAN, 369 Otsego Street
Ilion, N. Y.



Dollar Features

That's a very logical way of describing the two new features of Berger's Classik Steel Ceilings, because they result in considerable saving in erection time, and add dollars to your bank roll.

The bead is made extra long in shape of half an oval, reinforcing the ceiling plates at joints, fitting snugly over under-lapping bead, making a tight and perfect fitting joint.

The top of nailing button is counter-sunk, forming a self-centering, self-guiding, never-slip nailing point.

These features permit a considerable saving when erecting.

This means quicker work and better results.

There is money in it for you so get in touch with us right away.

The Berger Manufacturing Company, Canton, Ohio

For prompt service address nearest branch
New York Boston Minneapolis
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We also manufacture Ferro-Lithic and Multiplex Reinforcing Plates, Metal Lath, Roofing, Eaves Trough and Conductor Pipe and Sheet Metal Building Products of all kinds.

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11th Ave. & 22nd St., New York, N. Y.

country. A complete stock of Simonds saws suitable for the territory, Simonds planer knives and files will be carried at the new store. The Memphis branch is under the management of William L. Mayer, who formerly represented the company among the mills in Virginia and North Carolina.

The Standard Scale & Supply Company, 1345 Wabash avenue, Chicago, Ill., calls the attention of building contractors and other users of concrete to the 1914 Junior Model of its "Standard" mixer. The point is made that it can be used for any class of work on any kind of a job and will not only mix concrete but also cement mortar, plaster, etc. With four men the company states that three times the amount of work can be done as compared with hand mixing. Its daily capacity is 30 cubic yards The complete outfit is mounted on trucks with gasoline engine. A copy of catalogue No. 48-J can be secured by any reader of *The Building Age* on application.

A successful convention was recently held by the salesmen of the Canton Art Metal Co. at the main office, Canton, Ohio. Over 20 took part and the sessions were continued throughout the week. The first day was given over to the discussion of the company's general line, including roofing, eaves trough, conductor pipe and accessories, metal shingles and sidings. The morning of the second day was devoted to tin plate and the afternoon to skylights, furnaces and special sheet metal work. All day Wednesday was devoted to metal ceilings and Thursday was given over to building reports. Friday and Saturday were occupied in discussing metal ceilings and preparing plans for the extension of the business during the coming year.

The Des Moines Clay Company, Des Moines, Iowa, is the name under which the Acme Roofing Tile Company; the Des Moines Clay Mfg. Company, and the Goodman-McCormick Company have been consolidated. The factories are now under one complete organization and large or small orders from foundation brick to roofing tile can be shipped together—often with a great saving in freight. Each factory confines itself to one distinct branch, one, for example, making roofing and promenade tile; another facing brick and facing blocks and still another building blocks.

Interstate Machinery Company, Seventh avenue and Douw street, Troy, N. Y., dealers in used woodworking machinery as well as jobbers in that which is new, has erected a large addition to its plant in order to provide for its growing business.

"Fire Tragedies of the Sea and How They Can be Averted by Automatic Sprinklers" is the title of the leading article of the Grinnell automatic sprinkler bulletin for January which contains comments on the recent burning of the Volturno, a disastrous fire on the Imperator, and other recent disasters.

Sandusky Portland Cement Company, Sandusky, Ohio, makes the announcement that as "Medusa" products are being used in all parts of the world and to enable its many customers to realize more comprehensively the conditions under which Medusa gray and white Portland cement and Medusa waterproofing have been successfully used; also to illustrate the important work and advantages of Medusa products it has decided to issue at frequent intervals a house organ known as the "Medusa Review," the initial number being that for January.

H. H. Robertson, president Asbestos Protected Metal Company, Beaver Falls, Pa., has been elected vice-president of the Pittsburgh branch of the National Council for Industrial Safety.

One of the interesting features of the February issue of "DooR-Ways," the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill., is a short article illustrating and describing a large barn at Elgin, Ill., in connection with which 42 pairs of Richards-Wilcox trolley barn door hangers were used, together with 312 ft. of trolley track and a number of extra brackets to slide the doors. The barn itself is 48 ft. wide and 168 ft. long and side walls 24 ft. high. It has stalls for 30 horses and bins for 3500 bushels of grain and a capacity for 260 tons of hay. In addition there is much other

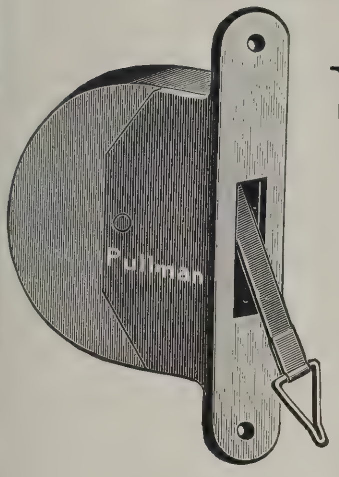
(*Continued on page* 102)

Whether You Build, Remodel or Repair by All Means

Pullmanize Your Windows

By Using

Unit Sash Balances



Made in various strengths for various weights of sash. They have a uniform size face-plate, so that the mortises can all be cut at the mill when the frames are made.

Pullman **Unit Sash Balances** provide the only satisfactory means of using the extremely narrow mullion so much in vogue. They permit a more solid, better frame, are neat, smooth-working, highly durable and, besides all these advantages, actually cost less in most cases than the old-fashioned weights and cords. Guaranteed for ten years.

Recommended by architects and building engineers everywhere. Our handsome book "Modern Windows" will tell you more about them. Write for it.

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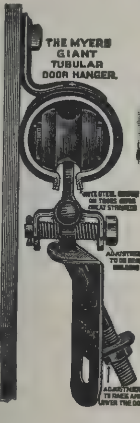
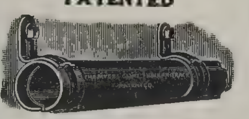

THE MYERS GIANT TUBULAR DOOR HANGER.
ADJUSTMENT TO RAISE AND LOWER THE DOOR



This is one of twelve different styles of door hangers for flat or tubular track with lateral and perpendicular adjustments. Write for Our Complete Door Hanger Catalog.

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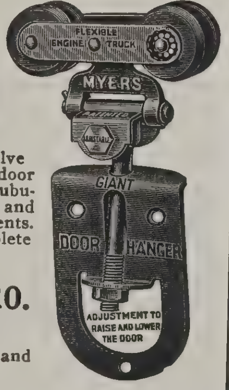
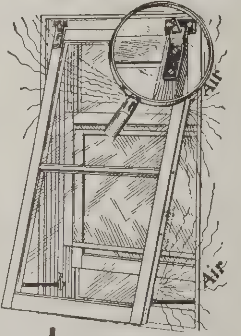
ASHLAND, OHIO
The Ashland Pump and Hay Tool Works

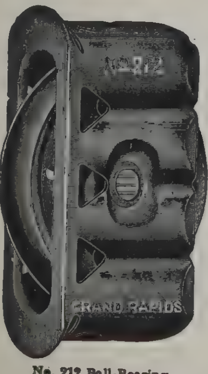


Phenix Storm Sash Hangers and Fasteners



SIMPLE — easily applied —rust-proof — non-rattle — and practically unbreakable. Positively the best storm sash and screen hangers and fasteners you can buy. If not at your dealer's, send for samples—today. Hangers only, 10 cents retail; hangers and fasteners, 25 cents. Catalog sent on request.

PHENIX MFG. CO., 054 Center St., Milwaukee, Wis.



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Write for free samples and prices.

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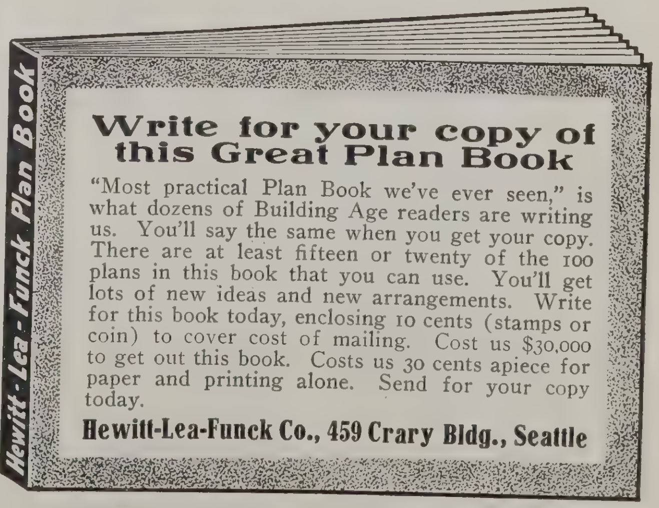

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1853 BUCK BROS. 1913

BUCK BROS

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We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

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Established 1827

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These Pins are used for supporting movable shelves in Book Cases. Cannot fall out or sag down. The best shelf pin made. Easily put in place by any one

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NO FALLING WINDOWS SMASHING GLASS POCKET FRAMES SASH WEIGHTS RATTLING BINDING CORDS with **AUTOMATIC SASH HOLDERS**

SPECIFY USE DEMAND

Automatic Sash Holders and save labor, lumber and money. *Send for trial set ($1 prepaid) stating approximate weight of sash, or our circular*

Automatic Sash Holder Mfg. Co.
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A UNIQUE TIME SAVER

The Jackson Aluminum Line Level makes big saving of time and labor. Takes the place of the old-fashioned sixteen foot straight edge. May be carried in vest pocket. No contractor, builder, carpenter, etc., can afford to be without. Stretch line and hang the level on it—It's positively accurate. Complete outfit goes into neat leatherette case and consists of the level with 40-ft. line also spring clamp for attaching level to steel square or pocket rule, thereby serving as a plumb rule or bench level. Ask your dealer or send $1.00 for outfit complete post paid. Send for Tool Catalog.

JACKSON'S LINE LEVEL OUTFIT

J. Woodwell Co., Sole Agts., 200 Wood St., Pittsburgh, Pa.

interesting matter not the least of which is a picture of a private garage at Bedford, Ind., the sliding doors of which are equipped with "R-W corner door hangers and flush locks."

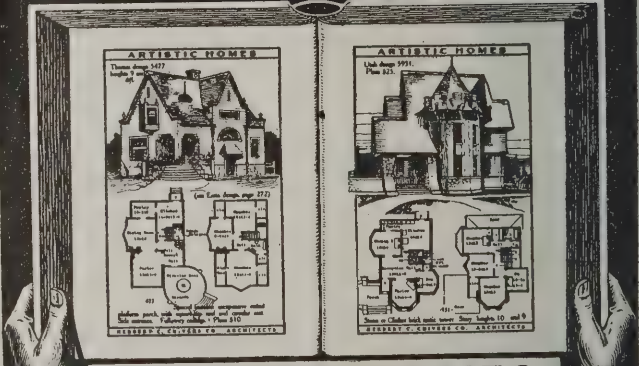
Some interesting information relative to the products of the H. W. Johns-Manville Company, Madison Avenue and 41st Street, New York City, are found in the February issue of its house organ, the *J-M Roofing Salesman*. There are several half tone engravings of buildings, the roofs of which have been covered with J-M Transite asbestos shingles or J-M asbestos prepared roofing made by the company. One picture is that of the Alhambra Theatre in Toledo, which is equipped with a J-M asbestos wood moving picture booth which is said to be a non-conductor of electricity and is cool and fireproof, and the building is covered with J-M asbestos built-up roofing. Another striking picture is that of the Coliseum at Terrapin Park at Parkersburg, W. Va., which is considered the largest roller skating ring in the state. This is covered with 11,500 sq. ft. of J-M Regal roofing.

The last issue of *The Exchange*, which is the house organ of the Standard Paint Company, 100 William street, New York City, contains interesting accounts of the gathering in New York City of the Eastern sales force and office staff of the company, following which there was a convention of the Western contingent in Chicago. After several days spent in the exchange of ideas and experiences, the high point of success was attained at a banquet in the Hotel Gladstone. In addition to these reports *The Exchange* contains a great deal of interesting information about "Ru-ber-oid" and "Ka-lor-oid" roofing, together with reference to the thirtieth anniversary of the "P & B" trade mark. Numerous illustrations are presented of buildings, the roofs of which are covered with "Ru-ber-oid."

Neat and serviceable railings for porches, outside stairs, etc., can be made from pipes, but frequently the angle at which the rails must enter the uprights makes the task of construction a difficult one because the pipe must be bent to conform to this angle. A solution is to be found in adjustable railing fittings, a number of different designs of which are illustrated in catalogue F, just issued by the Henry B. Pancoast Co., Philadelphia, Pa., manufacturer of pipe railing and awning frame fittings in malleable iron, cast iron and brass.

(*Continued on page 104*)

FINELY PRINTED NEW CUTS



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A 1024-PAGE PLAN BOOK
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Keighley Metal Ceilings

The Keighley line of metal ceilings is the most up-to-date on the market. You can't afford to bother with anything else but *modern* ceilings. And by modern we mean *construction* as well as styles and patterns. Learn all about the Keighley lock joint—write for Catalog L.

Write today.

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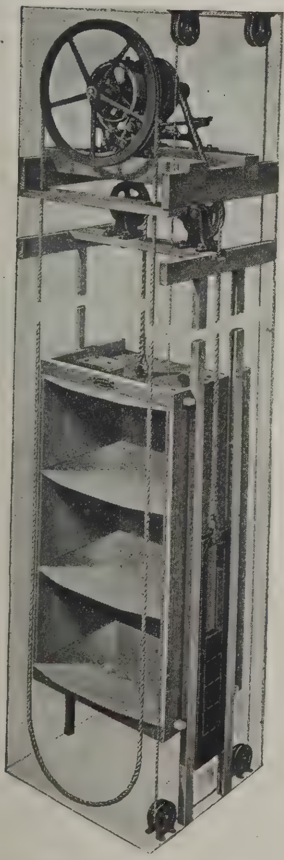

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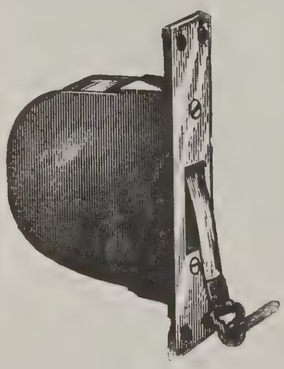
For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches and Wherever Durable and Sanitary Floors are Required. Also for Fireplaces.

STAR ENCAUSTIC TILE COMPANY
Bluff St., near Gist St., Pittsburgh, Pa.

Caldwell Sash Balance



Does away with weights and cords, and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

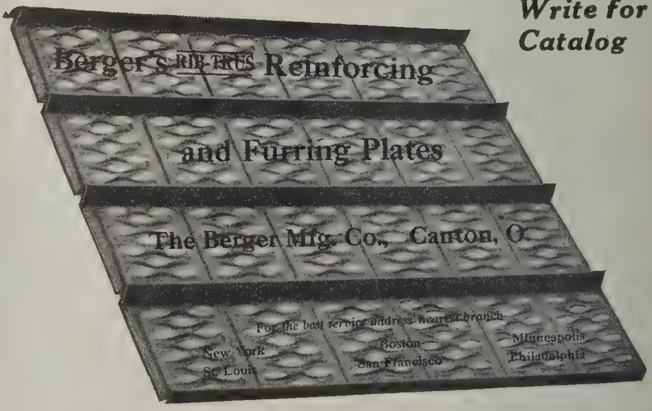
Write for circular to the
CALDWELL MFG. CO.
5 Jones St., Rochester, N. Y

These adjustable fittings may be instantly moved to any desired angle and form substantial couplings into which uprights and rail are fitted.

Stucco was first used in this country by the builders of the Spanish mission period. Colonial architects used it later, and about the time of the Civil War it came into use for the imitation of stone. The extensive use of stucco at the present time has led the Laclede Christy Clay Products Co., St. Louis, Mo., to manufacture a hollow clay tile which is especially adapted for use with stucco by the presence of dove-tail grooves on the exterior surface of the tile, thus permitting the stucco to be keyed to the latter. This product, together with various applications, as illustrated in halftone cuts of dwellings and other structures, is described in a 40-page catalogue recently issued by this company.

In the design of staircases for school houses, it is necessary to make some provision to withstand the wear upon the treads. This question is exhaustively considered in a pamphlet recently issued by the Universal Safety Tread Co., 141 Milk street, Boston, Mass., in which special attention is called to the Universal safety tread manufactured by this company. The tread is constructed of a heavy steel or brass base plate in which openings are punched, forming rows of vertical teeth. Strips of lead especially designed and hardened for the purpose of durability are then rolled into the openings and clamped in position by the teeth and clinched or riveted on the under side of the base plate. By this construction a constantly increasing wearing surface of lead is presented until the tread is entirely worn out, the teeth meanwhile reinforcing it and holding it securely in position.

A new door stop made of heavy wrought steel and of any finish desired has just been placed on the market by the Hardware Supply Company, of Grand Rapids, Mich. The stop is said to be very strong and durable and can be furnished with either two screws through the base plate or with one center screw.


Berger's RIB-TRUS Reinforcing
and Furring Plates
The Berger Mfg. Co., Canton, O.
For the best service address nearest branch
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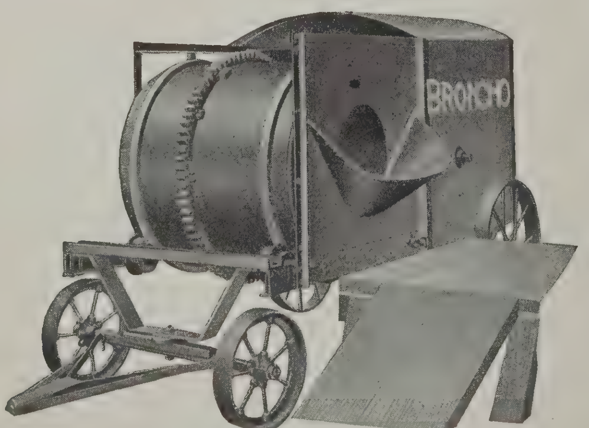

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Who is getting the big concrete jobs in your town? ARE YOU?

Or are you taking the small, unprofitable ones that nobody else wants simply because you haven't the right tools to work with?

You can mix concrete with a hoe and you can dig ditches with a spoon, but IT DON'T PAY. There are better methods, others are adopting them and getting ahead.

Did you ever ask yourself the question, *"What chance has my bid based on hand mixing at $1.25 a yard, against the fellows who mix it with a machine at $0.40?"*

Three times the cost. Three times as long to make a dollar.

Find out what the Broncho will do for you. A mixer without an equal for the contractor and builder.

Write for particulars about the 1914 Model.

LANSING COMPANY, 736 Cedar St., Lansing, Mich.

THE BUILDING AGE

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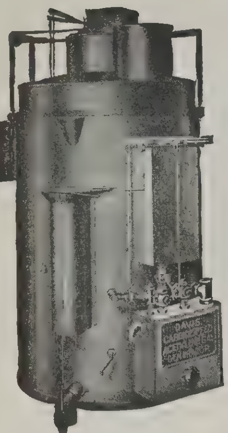

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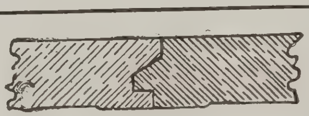

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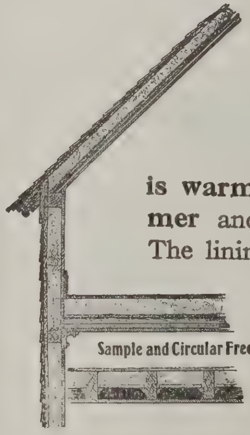

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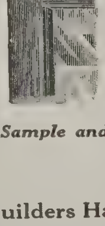

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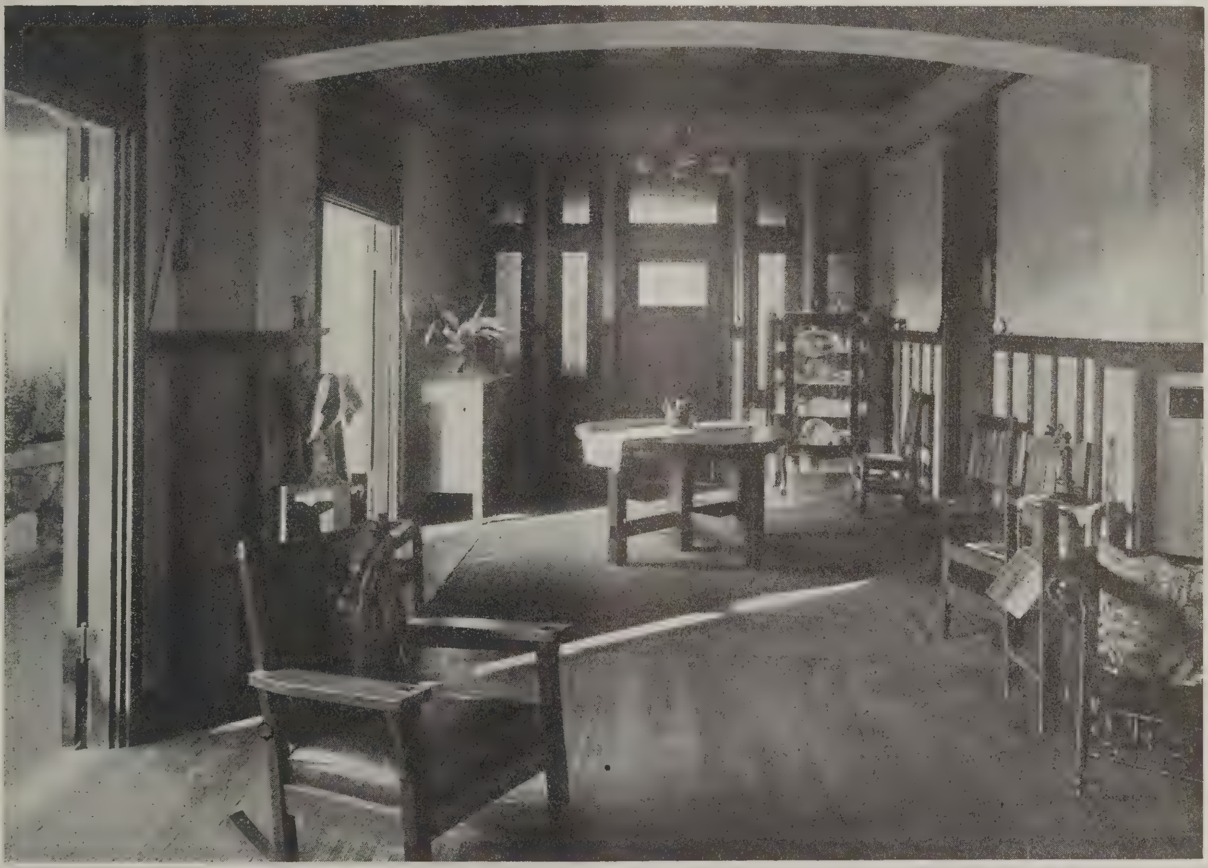
THE BUILDING AGE

NEW YORK, APRIL, 1914

Spanish Style Bungalow of the Tropics

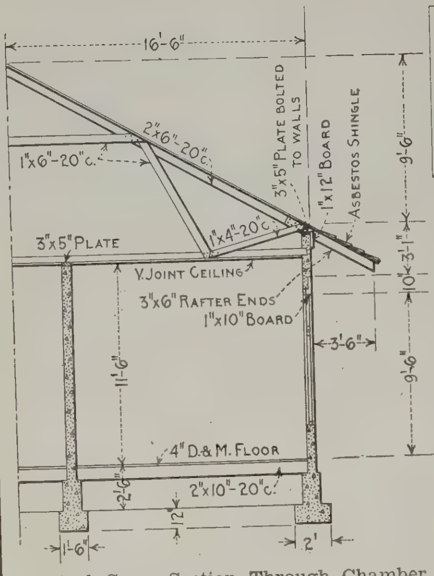
Details of a Dwelling Built to Meet Warm Climate Conditions—The "Patio" as a Breakfast Room

As a winter resort and Mecca for tourists, it is doubtful if any other part of American territory offers such manifold attractions as Porto Rico. The entire island is a huge park, a summer garden, with many characteristics different from those of the other Antilles. Porto Rico is probably endowed with more scenic beauty, greater fertility of soil and more numerous and valuable features making for general and continuous prosperity than any of the other islands of this group. It is 1,380 miles southeast of New York, 480 miles east of Cuba, and is on the direct route of all vessels engaged in the Atlantic-Pacific trade by way of the Panama Canal. The island is 35 miles wide and 100 miles long, with an area of 3,606 sq. miles. It has a population of 1,120,000.

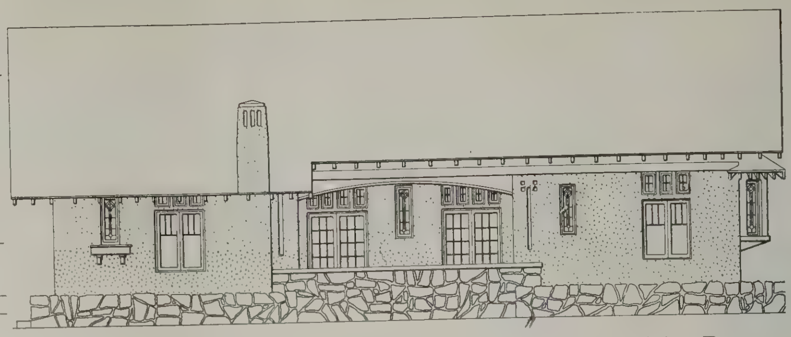


A Spanish Style Bungalow of the Tropics—View in Living Room, Looking Toward the Dining Room—Antonin Nechodoma, Architect, San Juan, Porto Rico

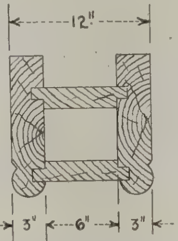
San Juan, in which the home here described is located, is situated near the east end of the north coast, distant from New York about 1,400 nautical miles. Here in 1511 was made the first settlement on the island. It is an important commercial city with a population of 35,000, and in its harbors



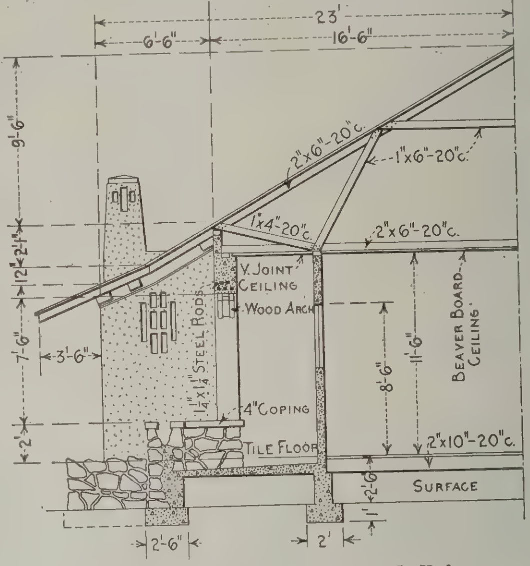
Vertical Cross Section Through Chamber Adjoining the Dining Room and Looking Toward the Bath Room—Scale 3/32 In. to the Foot



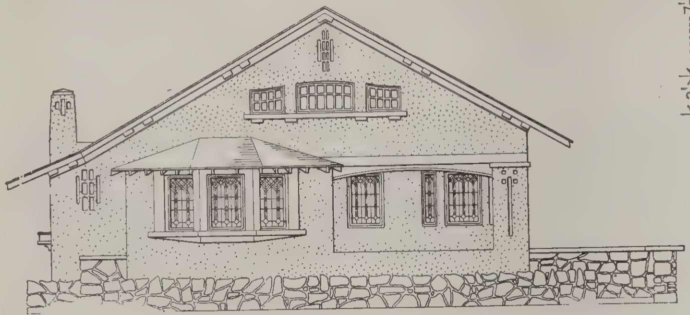
Rear Elevation Showing the Balcony Outside of Dining and Living Rooms—Scale 1/16 In. to the Foot



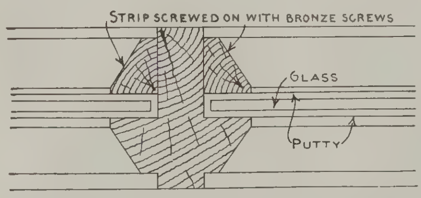
Section of Wooden Arches—Scale ¾ In. to the Foot



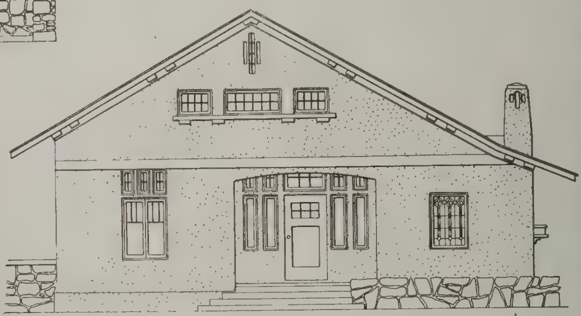
Section Through Dining Room and Balcony—Scale 3/32 In. to the Foot



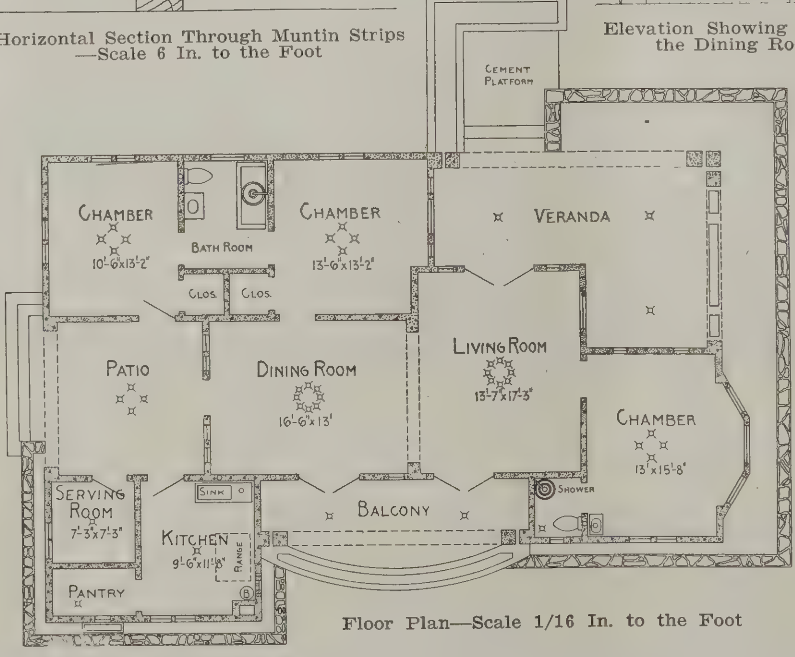
Side (Left) Elevation—Scale 1/16 In. to the Foot



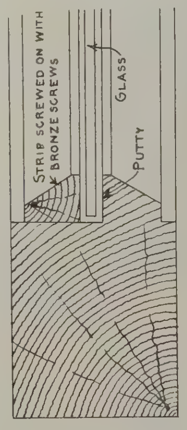
Horizontal Section Through Muntin Strips—Scale 6 In. to the Foot



Elevation Showing Patio and Entrance Therefrom to the Dining Room—Scale 1/16 in. to the foot

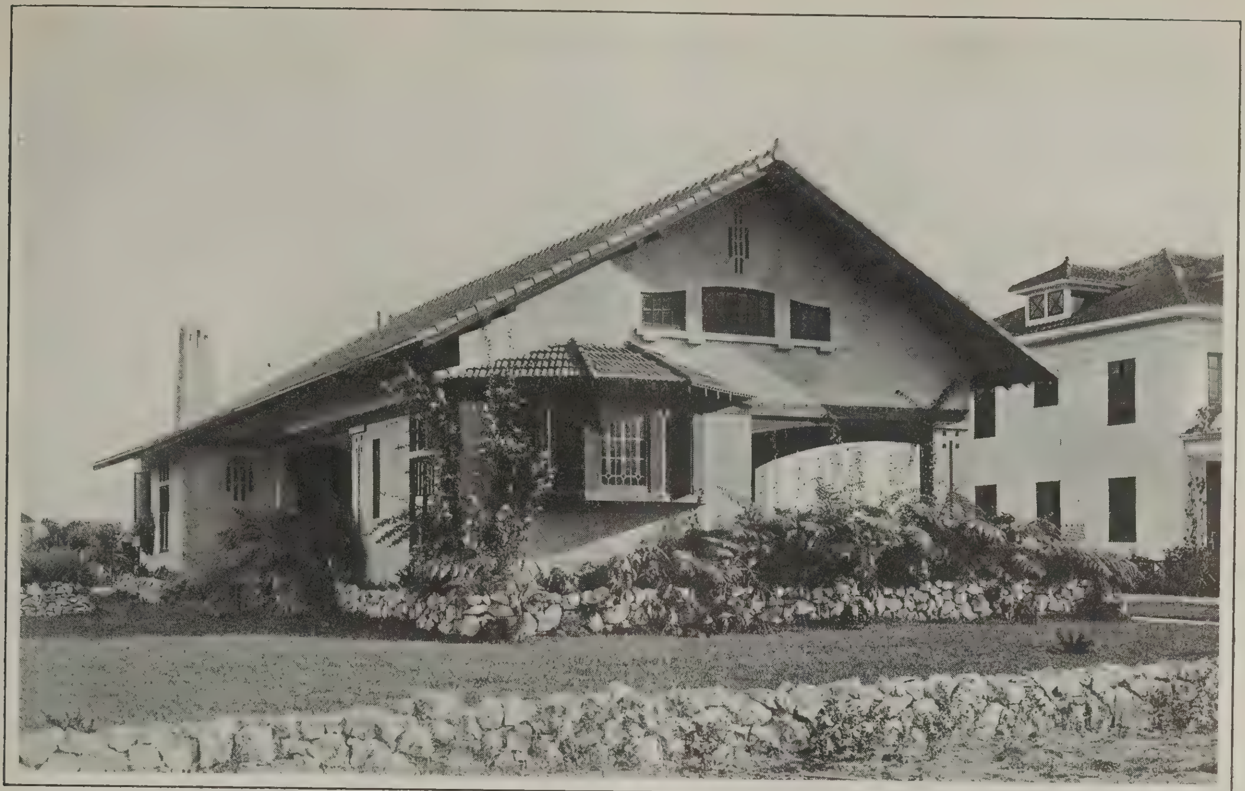


Floor Plan—Scale 1/16 In. to the Foot



Section Through Sash Rail—Scale 6 In. to the Foot

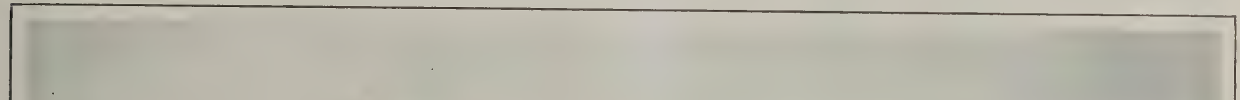
A Spanish Style Bungalow of the Tropics—Miscellaneous Constructive Details



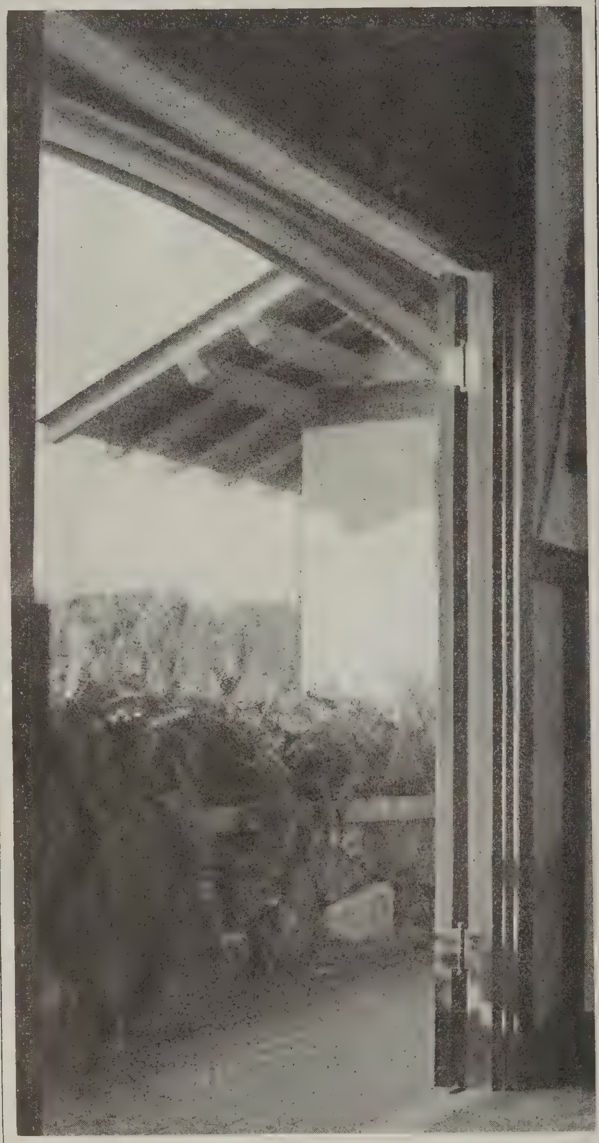
End View Showing Oriel Window and Rustic Treatment of Base Line of Building

steamers and sailing ships of all nations are to be found. The uniform rows of houses all of stone and brick and the great number of public buildings, rank it at once as a civilized city. Its principal streets are macadamized and clean.

The house which forms the basis of this article is located in Condado, a suburb of the city of San Juan, in which there are at the present time very active building developments under way. In most growing cities some particular suburb becomes most popular as the residence district for the more important persons who have business interests in



Front View of Spanish Style Bungalow of the Tropics—Antonin Nechodoma, Architect that city. Such has been the case with Condado, which lies between Borinquen Park and San Antonio Channel. The latter separates the suburb from the business portion of the capital city, and, in fact, forms a separate island on which the suburb is located. A fine bridge has recently been completed connecting the city of San Juan with Condado across this channel, and a trolley line has also been constructed which extends from the central district of San Juan to Condado. The residence in question is located in one of the most attractive parts of the suburb.



A Spanish Style Bungalow of the Tropics—The Doorway from the Living Room to the Balcony Showing Also the Deep Overhang of the Open Timber Roof

The Spanish style of architecture dominates the design and is perhaps most evident in the patio adjoining the dining room and looks out upon a broad lawn, with its luxuriant growth of tropical plants and palms. The front entrance door is approached from a cement floored veranda, enclosed by a rustic wall, surmounted by growing ferns, as shown in some of the pictures presented herewith. The living room is entered directly through double doors, and is provided with a second double door which swings out upon a balcony at the rear of the house, presenting another view of the tropical landscape. This is shown in one of the exterior views as well as in the detail of the doorway. The living room is adjoined on one side by a chamber of comfortable size, measuring, as it does, 13 x 15 ft. 8 in., provided with a private shower bath and toilet, and on the other side by the dining room, measuring 13 x 16 ft. 6 in. The latter room also opens out upon the balcony at the rear, and upon the patio on the side. Views in the dining and living rooms are here given.

Two additional chambers are provided, one 13 ft. 2 in. x 13 ft. 6 in., opening from the dining room, the other 10 ft. 6 in. x 13 ft. 2 in. adjoining the patio. These adjoining chambers are connected by a bath room, and each is provided with an ample clothes closet. The serving room and kitchen adjoin the patio at the rear of the house.

The foundations are of concrete in the proportion of 1 : 2 : 5. The walls are of concrete plastered with cement. There is no cellar and but one chimney, which is of concrete with no lining.

The principal framing members are plates 3 x 6 in.; rafters, 3 x 6 in.; and joists, 2 x 10 in., all spaced 20 in. on centers.

The roof is covered with Ludowici tile, manufactured by the Ludowici-Celadon Co., Chicago, Ill.

The house is plastered with two coats of cement and lime plaster tinted a brick brown and gray.

The floors of the baths, porches, and kitchen are of tile-wood. The floors of the remaining portion of the structure are of 1 x 4 in. plain yellow pine.

The dwelling is lighted by electricity and bronze electric fixtures are provided. The finishing hardware was furnished by the Lockwood Co., 16 Reade St., New York City.

All wood surfaces are stained in dark oak with Parker & Preston stain, three coats. The doors are of yellow pine 1¾ in. in thickness. Windows are of the casement style, 1¾ in. in thickness. The trim is of yellow pine. Details of windows are shown by the accompanying line cuts.

There is no heating plant. Cooking is accomplished by means of an electric stove with two compartments, and an electric water heating boiler which is located in the attic.

Sewage is handled by means of a filtering loose-rock cesspool. All plumbing fixtures are of modern design, and made by the L. Wolff Manufacturing Co., Chicago, Ill.

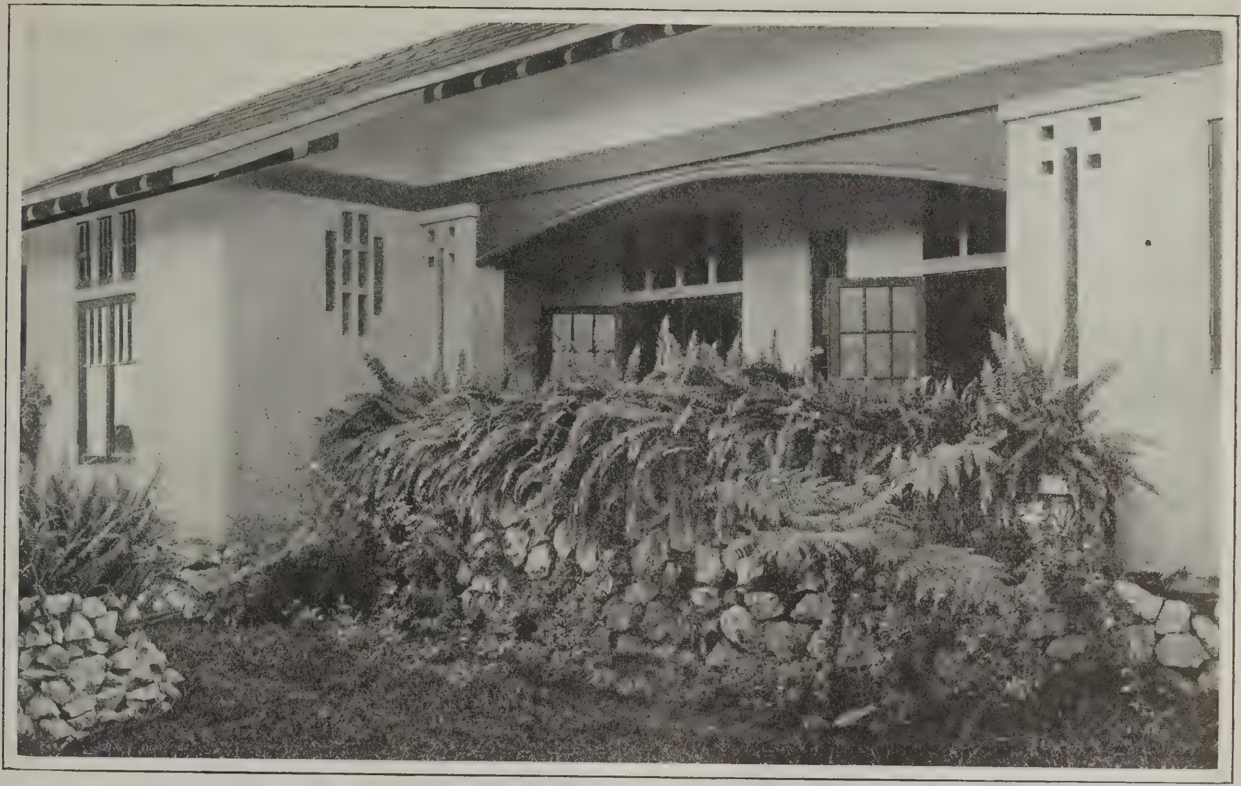
The estimated cost of the dwelling was $9,000. It was erected in Condado, a suburb of San Juan, Porto Rico, for H. Clyde Gregory, by F. B. Hatch, contractor, under the supervision of the designer, Antonin Nechodoma, architect, San Juan, Porto Rico.

◆

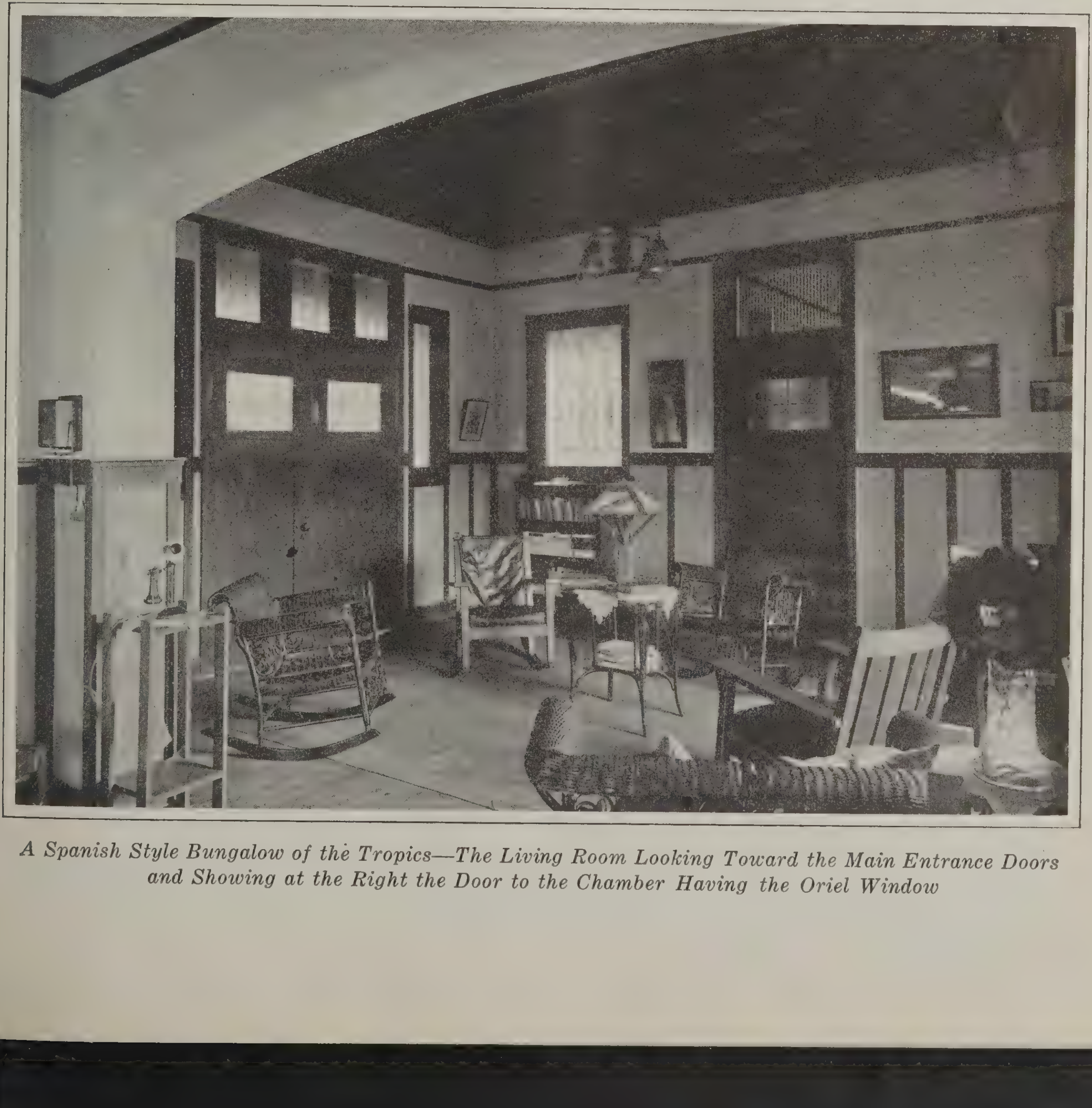
Cornices of Tall Buildings

At a recent meeting of the Architectural Association of San Diego, Cal., one of the speakers was Charles Cressey, who discussed "The Use and Abuse of Cornices in the Design of Tall Buildings." From what he had to say we make the following extracts:

Could it be that every architectural feature of a tall building might speak in its own defense, that dominating feature of so many designs, the cor-



The Luxuriance of the Verdure Enclosing the Balcony at the Rear and Opening from the Dining and Living Rooms—The Kitchen with Its Quaintly Shaped Window is Seen at the Left



A Spanish Style Bungalow of the Tropics—The Living Room Looking Toward the Main Entrance Doors and Showing at the Right the Door to the Chamber Having the Oriel Window nice, would probably be the one to find the greatest difficulty in justifying its existence. So solidly founded in traditional design is this feature that it is with hesitation one dares to question its necessity or propriety in modern design. The skyscraper, however, is an instance where every detail of historic design may legitimately be questioned, and particularly the magnified details from the venerable "Orders."

Adoption of the Classical Cornices

Though instances do occur where practical shade and shelter are secured from the use of the classical cornice, it is doubtful whether this aspect has much to do with its general adoption on high buildings. Is there, in fact, a single practical advantage which can be urged in favor of the spreading cornice usually found crowning a skyscraper? On the other hand, there can be no doubt that its practical disadvantages are numerous. What, for instance, would be more unsatisfactory structurally, than the eccentric loads and complicated framing connected with the support of a heavy overhanging mass, which at its best does nothing, is of dubious effect artictically, and which places purely optional weight where it decreases rather than increases the general stability of the building. That this matter of undesirable load is recognized is obvious from the use of painted shams, "just like stone," upon buildings where cost has evidently not been the serious question. I would here disclaim any antipathy to the use of metal in the abstract, if it can be presented in honest and seemly guise. Surely, stone detail is an insult to a material capable of good results on its own merits.

Cornices on Limited Frontages

Whatever may be the material of the cornice it is always more or less of a troublesome feature, particularly on limited frontages. There must be few architects who have not, at one time or another, cursed, politely perhaps, the fact that they dare not overhang a neighbor's land. Is not every city full of examples of stunted ends and painful expedients to "stop" the cornice which no ingenuity can make "return"? True, many buildings would have less pleasant wall surface next the boundary lines were it not for the insistent demand of the cornice terminating above. True, too, it is that much valuable light is lost for this same reason.

American cities are, unfortunately, able to show many instances of the unbalanced effects due to prominent cornices appearing on only one or two faces of buildings in full view. Even where conditions permit a continuous cornice, how rarely does the building appear truly plumb—a result not unexpected when one considers that the eye, traveling upwards from a base thinned to its limit, cannot pass the great cornice overhang to anything above substantial enough to correct the illusion. The best efforts occur where the cornices form subordinate features and are well below the sky line.

Influence of Strongly Defined Cornices

The habit of using strongly defined cornices is exercising a bad influence on the appearance of cities, as tall buildings of single frontage become more numerous. Usually there is little regard for harmony or continuity of level of adjacent cornices. Seen from the street it cannot be said that the high cornice gives any great amount of pleasure, however carefully detailed it may be, while the ponderous members must form a source of wonder, if not of humor, to the spectator who views them from a high level.

Conditions limiting the architect to-day, especially in tall buildings, appear to demand that the custom of projecting architectural features should be restrained, and a substitute found in recessing. It would appear, too, that the upper stories of high buildings might more generally be built on receding planes, and so express outwardly the gradually reducing weight of the structure.

The above thoughts lead the writer to the conclusion that a truer architectural crown to the skyscraper would be gained if the projecting cornice could be entirely omitted, and the powerful vertical lines allowed to dominate, unaffected by the abrupt and limiting cornice edge. The designer might then find scope for pleasant fancies in pierced parapets and other openwork, expressing protection and inclosure of the roof, and, gain a restful merging of the mass of the structure into infinite space.

◆

Maine's Freak House

Without doubt one of the queerest habitations for man was the mammoth dwelling which for years occupied a site in the city of Portland, Me., overlooking Casco Bay and Fort Allen Park, and which was erected by the owner after much expenditure of time and money and with frequent interruptions, so that years elapsed before everything was completed. The house was built for his own occupancy by Frank W. Cummings, a railroad man who achieved signal success in his chosen calling, but who had somewhat peculiar ideas regarding the design and arrangement of a home.

Within the walls of the dwelling was a single closet, and it was attached to a servant's room on the upper floor. There was but one bath room in this bachelor's palace, but along one of its walls were arranged four wash bowls where the guests might entertain each other during their ablutions.

In the basement was a large bowling alley, and here the owner had designed to have stored and tabulated also in tiers of cupboards an immense collection of locomotive models.

The rooms on the first floor were designated by silver letters, but as there were over 50 different apartments the alphabet was exhausted long before the numbering was concluded, so that the rooms on the upper floors had to be identified by numerals. The house cost in its construction something like $70,000, and the furnishings many thousands more. Shortly before the owner was about to take possession of his palatial residence he was fatally stricken with pneumonia and the unoccupied home he bequeathed to a sister. At her death the property was sold for just about what the land was worth, for to none other than the builder did the structure present inviting residential features. The building was razed to the ground and the estate has since been incorporated into the adjoining park. The seaward view is as splendid as before and is enjoyed by many, but the bachelor's palace has doubtless been forgotten.

A Plank Frame Barn at Melrose, N. Y.

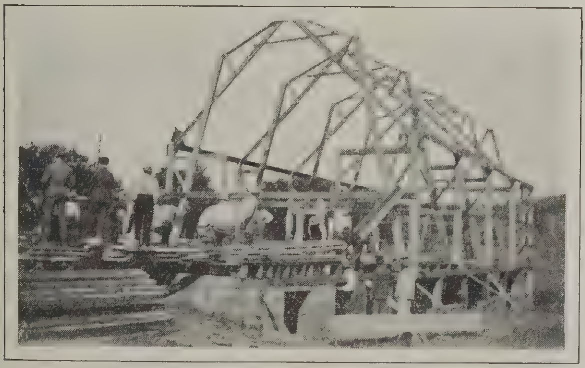
Basement Walls Are of Solid Concrete About 9 Ft. in Hight —Pictures Showing How the Various Bents Were Raised

THE subject of barn construction and arrangement appears to be one of never-ending interest to the practical builder and supplementing the many examples of this character which have appeared in past issues we present at this time plans and photographic views of a well-equipped barn which was recently erected on the farm of Howard F. Perry, near Melrose, N. Y. One picture shows the appearance of the completed structure with other farm buildings in the background; another picture shows the frame on "raising" day, just after the fifth bent had been set up in place and the men getting ready to set up the sixth bent, which in the half-tone engraving near the top of the second column is shown partly raised, the men lifting it with pike poles. It takes about ten minutes to set up a bent in this way. The barn is 36 ft. wide and 96 ft. long with an interior arrangement as indicated by the floor plans.

The basement walls are of solid concrete resting on rock foundation and are about 9 ft. high, battered on the inside from 20 in. at the base to 12 in. at the top. The walls are made of gravel and cement with all the field stone worked in that could be utilized to advantage and not touch each other.

A glance at the picture showing the completed building gives an idea of the ample provision for light and also for egress and ingress by means of numerous doors shown on the plans.

Appearance of the Completed Barn and Surroundings


The Frame on "Raising Day" Just After the 5th Bent Had Been Put Into Place

A Plank Frame Barn at Melrose, N. Y

The horse stable occupies the west end of the barn, there being six single stalls, each 5 ft. in width—except one at the north end which is 10 ft. wide—and all are fully 16 ft. deep. There are two large box stalls, each 10 x 12 ft. on the opposite side of the feed room from the horse stable.

Provision is made for water at the point marked "W" on the plan, where Troy City Water Works are tapped, the mains passing only a few rods south of the barn.

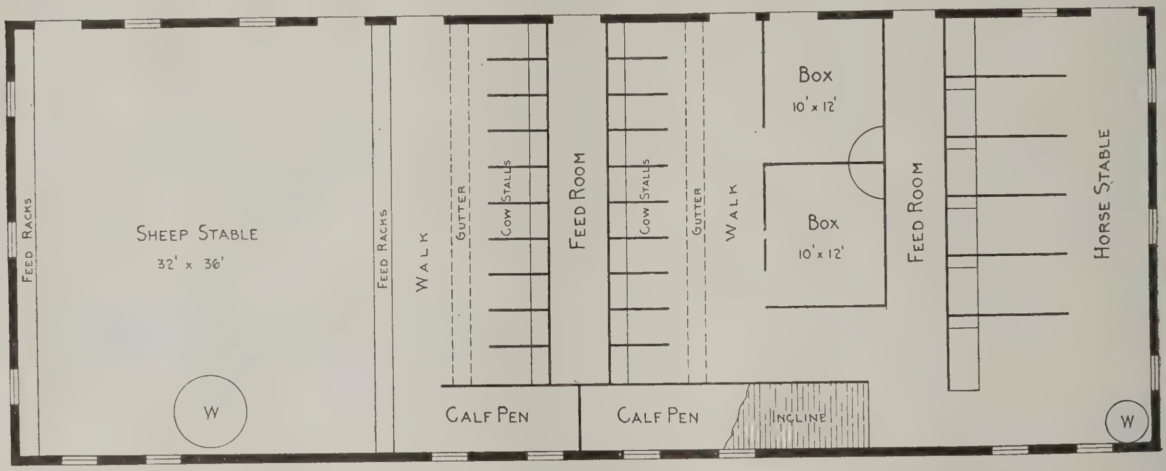
A double cow stable to accommodate 20 cows and having cement platforms, walks and gutters, is located in the middle of the main floor with two calf pens adjoining, each measuring 6 x 16 ft. Above these calf pens is an "incline" or run-way by means of which horses may be taken up to hitch them to market wagons or carriages on the main floor as circumstances require. This is one of Mr. Perry's pet features, as he objects to going entirely around the barn on a stormy morning in order to permit of hitching a horse to a wagon. On returning from market he drives directly on to the barn floor where the horses are unhitched and then taken down the incline, first to water, and then to their respective stalls without unnecessary exposure to storm or cold.

The Men Raising the 6th Bent with Pike Poles

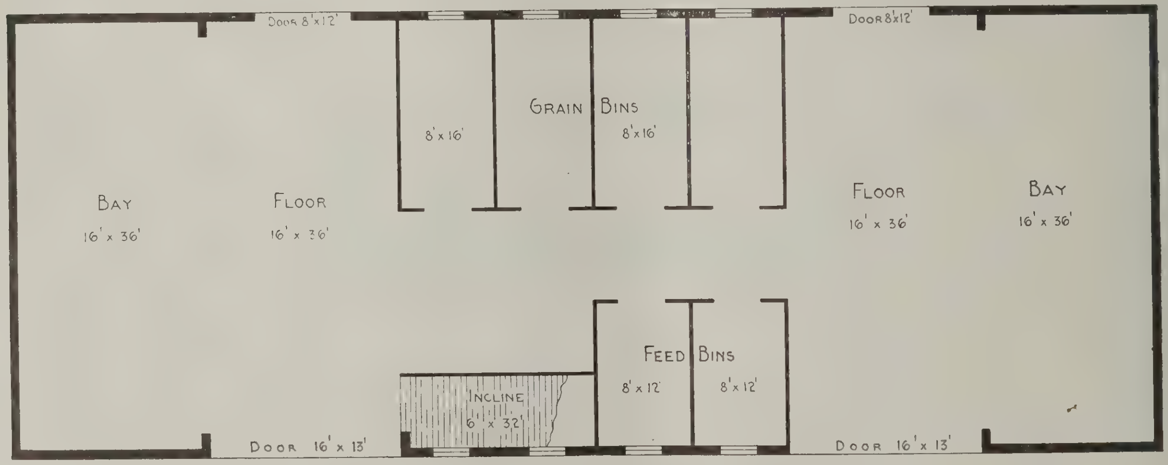
A roomy sheep stable is provided at the east end of the barn, this measuring 32 x 36 ft. with feed racks at each side and a water tank on the north end. The lighting is by means of numerous windows.

The second floor has a large bay at each end, 16 x 36 ft. Two drive floors are provided with extra large doors 16 ft. wide and 13 ft. high on the side of the embankment. On the opposite side narrow doors are provided. Two middle spans are used for storage of grain and mill feeds to the hight of 8 ft. above which point is a large hay bay, 32 x 36 ft.

The barn has 16 ft. posts and a curb roof which offers a large amount of storage room for hay and grain. There are three large girders which support the bay above the grain bins and during the process of construction a plank was temporarily nailed near the top of each arch for the purpose of holding a scaffold from which to nail the point of the upper set of rafters. After the steel track to carry the hay pulleys was in position these plank were taken down, leaving the arches unobstructed from floor to roof—a hight of 34 ft.



The Foundation Plan Showing Arrangement of Stalls; Position of Feed Rooms, Walks, Incline, etc.



Ground or Hay Floor Showing Driveways, Feed Bins, etc.

A Plank Frame Barn at Melrose, N. Y.—Floor Plans—Scale 1-16 in. to the Foot

The carpenters employed in the erection of this barn had never before seen a plank frame. The plank used had once done service in a large hotel at Saratoga, but the hotel was razed to the ground the winter before and the wreckage sold for various purposes. The timbers were therefore full of nails, but although this took time from the work of construction, the seven bents were all built and the side timbers cut during the period from Wednesday morning until Saturday noon. The barn was raised Saturday afternoon in about three hours.

The work of construction was done by John L. Shawver, Bellefontaine, Ohio.

It will be seen from an inspection of the picture of the completed building that the barn is provided with two ventilators for purposes of ventilation. These are what are known as King Aerators and are made of heavy galvanized steel, are said to cost less than a wooden makeshift and are stormproof. The metal base which holds the aerator firmly to the roof, thus requiring no framing, is 28 in. in hight. It is bolted and nailed, making it very secure. From the base to the vane showing the points of the compass, the hight is 11½ ft. and from this point to the spear head above the weather vane is 30 in. By means of the aerator the air in the barn is freshened on the proper principle, permitting no down drafts, yet constantly changing the air so that it is at all times wholesome. Another point made in regard to this form of ventilator is that it prevents excessive dampness from rotting the wood and rusting the metal, and prevents damage to harness, buggy tops, etc., from mold. The aerator is made by the Galvanized Steel Cupola Company, with headquarters at Owatonna, Minn.

The foul air pipe is of galvanized iron, measuring about 8 x 15 in. in cross section and follows the bents to the ridge and extends within 18 in. of the basement floor. There is a flue on the wall by the side of each window extending to the ceiling. The top is open to distribute the fresh air over the stock. By means of the shut-off little or much can be admitted, according to requirements.

The wall on the west end of the cattle yard and as seen in the picture is 40 ft. long and 9 ft. high. It forms one side of a hen house and manure shed as well as a wind-break for the cow yard, which is shown in the picture of the finished barn.

Preparing Architectural Drawings

Some Pertinent Suggestions Regarding a Subject of Special Value to Those Engaged in the Building Business

TO those actually engaged in the building trades, more especially to the student who is studying construction in any or all its various branches, the ability to correctly read architect's drawings is of the utmost importance. In order, however, that drawings may be readily understood it is essential that they be properly and accurately prepared and in a manner wherein a recognized system of lettering, figuring and coloring has been adopted. In these few hints on the reading of architectural drawings, says a writer in a late issue of the London *Building World,* it is purposed to present brief points with regard to their preparation which will be appreciated by readers who are compelled to make working drawings from sketches which are in themselves incomplete. When dealing with a set of drawings it must be remembered that it is absolutely necessary to take plans, sections and elevations together as forming one scheme or idea, for what is perhaps only imperfectly expressed upon one drawing may sometimes be made quite clear on another. Should a recess be indicated on the plan it is obvious that unless a section or elevation of this detail be studied the type and the method of finish at the head cannot be ascertained, and this same principle applies throughout.

Usual Method of Procedure

The usual method employed in all offices is to prepare firstly the complete plans, sections and elevations of the whole scheme to a scale of 8 ft. to 1 in., from the approved sketch designs, and then any particular feature is detailed to a larger scale, say 2 ft. to 1 in. Subsequently full-size details are prepared of the various mouldings and features as necessary, and each detail drawing must be followed in preference to the smaller scale drawing originally prepared. Of course, it is quite usual in many cases to detail certain features at an early period to assist in the more accurate preparation of the small scale drawings. But these are merely preliminary details, and in many instances they are redrawn and properly finished up when required at a later date. Figured dimensions must always be followed in preference to dimensions scaled from a drawing, and many mistakes would be avoided in the execution of works if draftsmen would only insert more figured dimensions, as there is often great difficulty in getting drawings absolutely true to a scale when working on such materials as tracing-linen and paper, which are much affected by the variations of the atmosphere. Sizes, unless otherwise stated, are those to the face of the rough work. For instance, a measurement shown between two brick walls indicates the face of the brickwork and not the face of the plaster or other finish that may be applied. Center lines should always be worked from, whether in preparing or reading a drawing, and by this method the job will be greatly facilitated. In outlining a roof truss the student will find it much easier if the center lines of all the members are drawn in the first instance, and the sizes are then scaled off on either side, and in addition he will be sure of getting all the members so disposed in relation to each other that the loads will be transmitted in a perfect manner.

Working Drawings are Colored

Architectural working drawings are invariably colored, and a certain amount of system prevails with regard to the colors used for each particular material, but slight variations are made by different offices, not, however, difficult to follow when a little experience has been gained. On the plans the flooring materials are indicated by light washes, wood being shown a light brown or yellow; cement, a pale gray; tiles, light pink; marble, light green; stone, very pale blue, and granolithic, a pale mauve. Patent flooring materials are indicated by a light wash approximating to the color of the real article.

On roof plans, tiles are shown in various shades of red; asphalt is indicated by a dull brown; slates by blue or green washes; and lead by a color as nearly as possible resembling that material. It is a common practice in coloring to indicate only those materials which are actually cut by the section line, but where the surfaces in elevation are treated, light washes are applied similar to those employed on the plans, while plaster is indicated by a light green or gray.

How Materials are Indicated in Sectional Drawings

With the materials that are actually cut through by the line of section, the colors employed are invariably of a darker nature than those above mentioned, and the following are the tints generally used: Brickwork, dark red; stonework, dark blue; woodwork, dark brown; concrete, gray or fairly dark mauve; plaster, dark green; iron and steelwork, Prussian blue.

For elevation work the colors adopted are frequently selected to give good effect to the drawing, while at the same time indicating the nature of the material. Brickwork is expressed with many shades of red, one of the most successful being an orange-red, which does not entirely lose its bright effect when dry, and a little gamboge added to the color when mixed will give this result. Gauged work is usually shown by a shade of scarlet. Woodwork in elevation is usually colored a light brown (made with burnt sienna and sepia) when wrought, and a light yellow when not wrought, but frequently greens of various shades are used for effect.

Roughcast is shown in a pale yellow, or left white, and a little light shadow color is touched on in places to relieve the monotony. Stonework colors are influenced by the kind of stone indicated, the most general color being a light yellow, but such a stone as red Mansfield would be shown a dull red to distinguish same from any other stone, while granite would be shown in various shades of gray or red. Iron and steel are colored a light Prussian blue, and leadwork in a similar manner to that on plan.

Slates are shown by blue, green or gray, and tiles by a cherry-red or any shade which is in sufficient contrast to the red employed for the brickwork if the two materials appear on the same drawing. Glass is usually shown by blue or green, but a great variety of colors are used to show this material. For shading an elevation drawing a very good color can be obtained by using crimson lake and cobalt blue mixed in the correct proportions, and it must be borne in mind that atmospheric effect can only be obtained with the use of blue in some shade or other. In coloring plans and sections a very good effect is obtained if a little lampblack be mixed with every color that is used, as it has the advantage of toning them all down and making them harmonize more completely.

Black and White Work

For black and white work, where colors cannot be used to indicate the different materials employed, they are expressed when in section by means of hatching, which varies with each material, and the method is extensively used. Brickwork can be recognized by simple straight lines, placed fairly close together, and drawn at an angle of 45 deg. with the horizontal plane. Stonework is indicated by a similar method, but every alternate line is replaced by a dotted one. Woodwork is grained to imitate the annular rings. Lead is shown by lines drawn closely together at 45 deg., crossing each other at right angles, while steel is shown by a hatching of dotted lines. Concrete is expressed by small irregular shapes, intended to represent the pieces composing the aggregate, and plaster is indicated by a filling of small dots. Another kind of hatching is that of drawing lines at an angle of 45 deg., making alternate lines, thick and thin, and this method is frequently used to show wrought iron.

The Plan as a Horizontal Section of the Building

In reading the plan of a building, remember that it is really a horizontal section taken at any hight required to express all the principal walls, partitions, stairs, doors, windows and fireplaces. Details which are above the line of section are frequently dotted, and this method is applied to all diagrams, whether plans or sections, to show some position or form which could not actually be seen on the drawing, but which bears some definite relation to the features which are really seen. When staircases are indicated the lines on plan show the riser face, but do not include the nosing to the tread, if there be one and the width, if figured, means that which is between the wall and inside of outer string; or if free of all walls, then the distance between the two strings in the clear. Doors and windows, unless otherwise stated, are shown between the rough work, but frequently the doors are figured in the clear. Before reading a section it is advisable to look carefully at the line on which it is taken, and this will be given on the plan or plans. The direction in which the view is taken can also be ascertained by turning the plan, so that the letters or numbers indicating the section line are upright and read correctly. The hights on a section should always be figured from floor level to floor level, and not to the ceiling line, except in special cases. Sections should always be taken at points where the principal feature can be shown, such as the staircases; and it is advisable to show them taken through different parts of the building in preference to crowding detail by dotted lines.

Use of Isometric Projection

Isometric projection is a very useful method for detailing constructional work, and is much used in good-class work, where joints and similar details have to be shown. It consists of drawing all the horizontal lines of a flat diagram at an angle of 30 deg. with the horizontal plane, while the vertical lines are drawn at right angles to the same plane, and this results in a diagram which, unlike a perspective, shows the different faces of an object as they really are, and not as they would appear to the eye. Thus they can be scaled from, and all measurements are taken either vertically or on the angle of 30 deg. and none horizontally. The architect is called upon to read steelwork drawings where the steel-framed type of building is employed, and in large structures it becomes absolutely necessary for him to see that the framing is designed in such a manner that the desired architectural treatment can be obtained, while good construction is maintained.

Drawings Prepared from Architects' Sketches

The majority of the drawings are prepared from the architect's sketches, and then revised to suit any alterations that may be made when the final ones are prepared. The steelwork is usually indicated by firm lines on the plan of the floor, at which level it occurs; that is, the steelwork over the ground floor and at the first-floor level would be shown on the first-floor plan of the building. Occasionally it is shown by dotted lines on the floor plan over which it occurs, so that the steelwork over the ground floor would be shown by dotted lines on the ground floor plan, the stanchions and supports only being indicated by solid lines on this drawing. The lines shown, of course, always indicate the center lines of the girders and joists, and all dimensions, sizes and weights are indicated by figures, and not necessarily drawn absolutely to scale.

In reading drawings which are descriptive of the orders of architecture, students must remember that all the parts are proportioned to the diameter of the column, and therefore a scale is constructed which is composed of modules and parts, one module being equal to half the diameter of the column. Each module is divided up into thirty equal divisions, called parts, and from this scale the whole order composed of column and entablature is drawn.

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Makers of phonographs are aiming to use wood instead of metal in all parts of the instrument where this is possible, to increase the mellowness of tone.

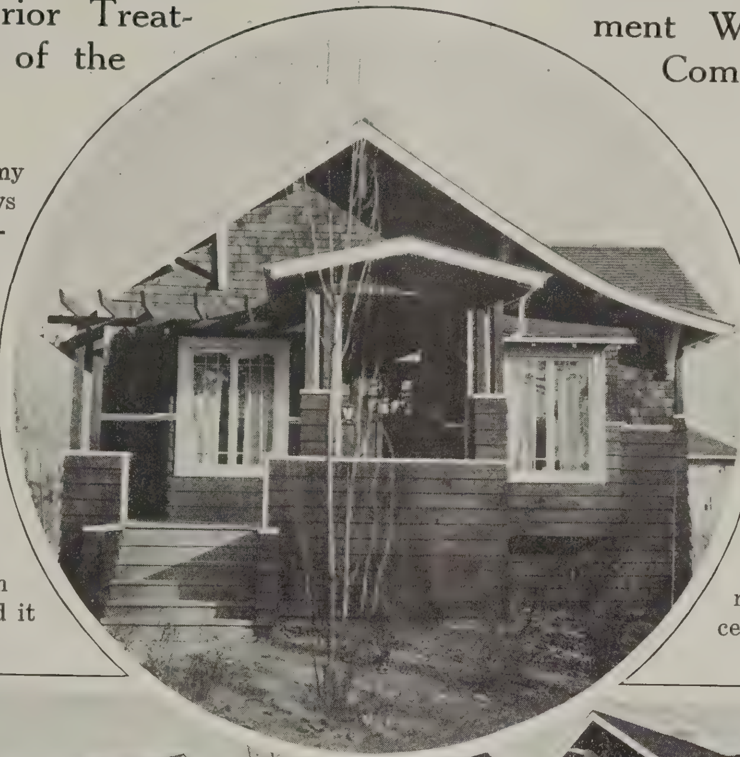
The Bungalow of a Landscape Architect

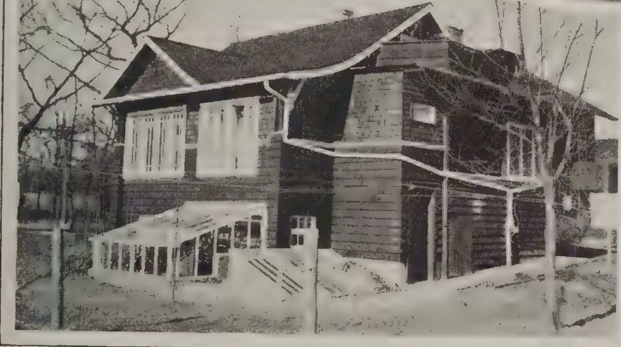
An Exterior Treatment Which Gives No Hint of the Comforts Within

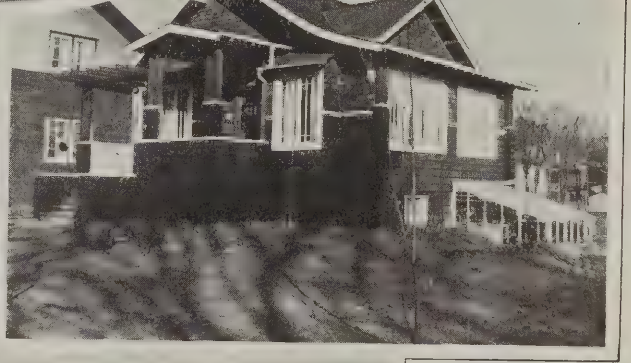
THE vast army of bungalows thickly scattered over the country has recently admitted to its ranks the recruit of small stature which forms the basis of the present article. This bungalow was finished by a landscape artist of the Middle West late in the fall of 1913, and it is his intention to enlarge the house by adding 18 ft. to the front, which will then make it approximately 50 ft. long and 25 ft. wide. The nature of this small but extremely unique dwelling is such as to attract the prompt attention of the observing passer-by, and proved to be of great interest when the particulars of the structure were investigated by a representative of this journal, and some of which are here described.

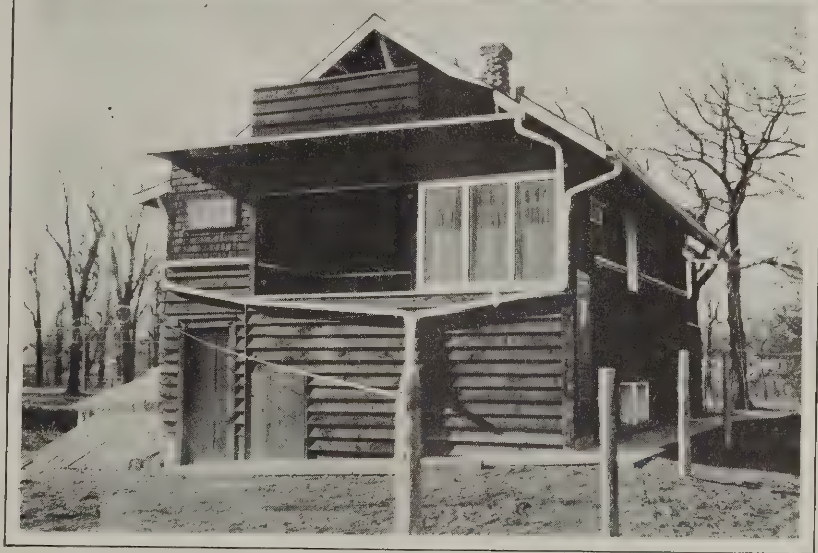
The present owner and builder formerly lived in a seven-room cottage and built the bungalow which he now occupies with the especial purpose of giving his wife a minimum amount of housework and at the same time have comfortable and well-lighted quarters, each room being easily accessible and of a size requisite for the purpose for which it is used.

It will be noticed from the accompanying floor plans that there are in reality but three rooms—a combination living and dining room, a bedroom and a kitchen, the space consumed being approximately 24 by 24 ft. Leading from the kitchen is a small bathroom and a rear porch. The present arrangements are but a means for future developments, as it is the owner's inten-

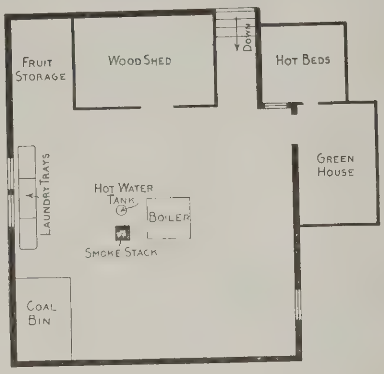




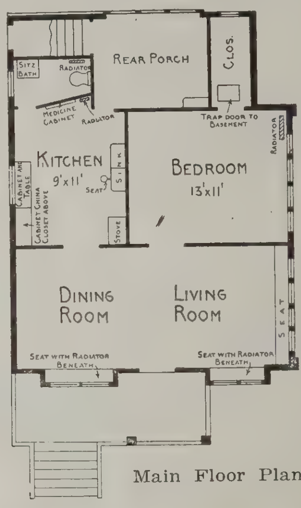




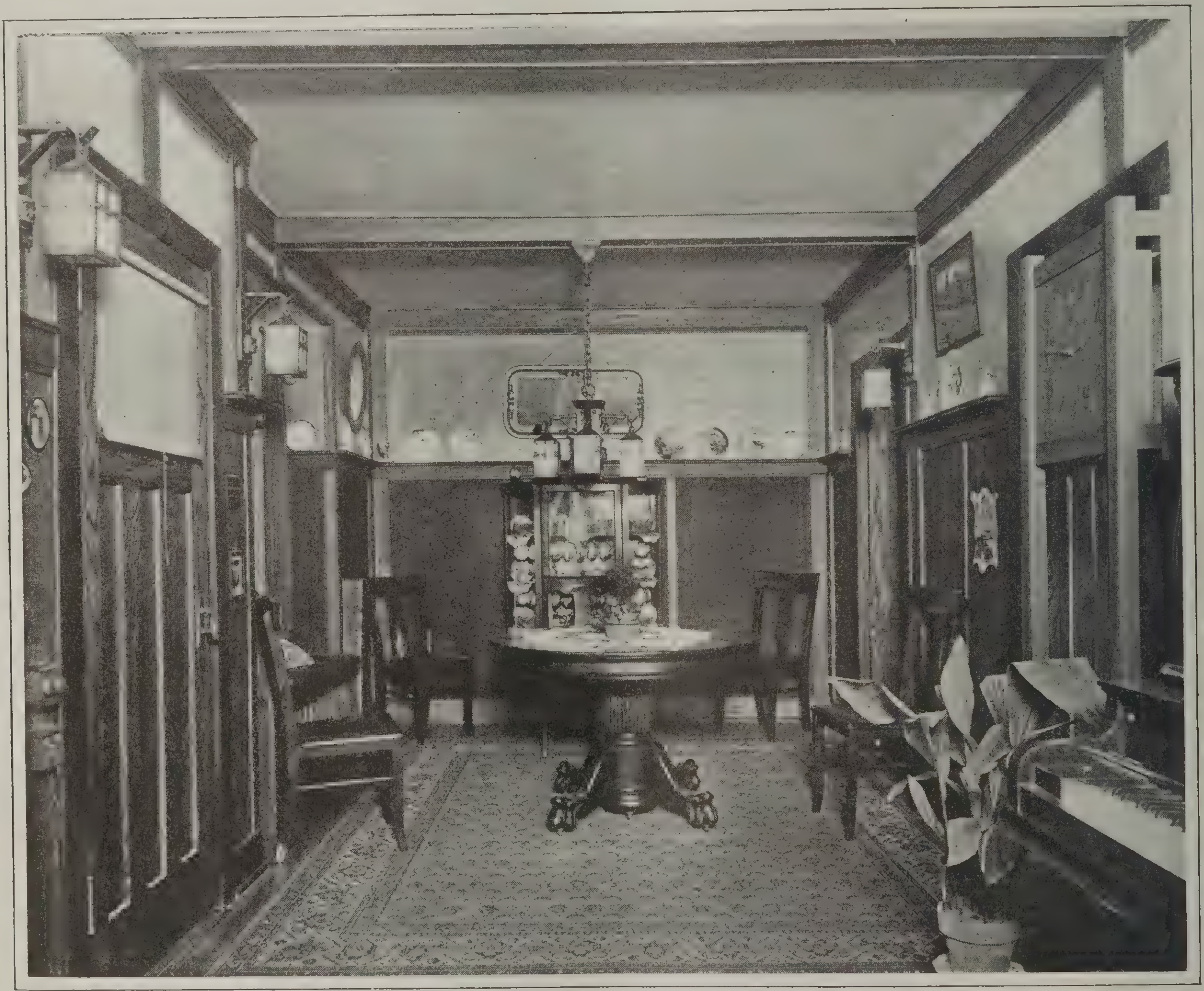
The Bungalow of a Landscape Architect—Various Exterior Views Showing also the Greenhouse and the Hot Beds tion to extend the building 18 ft. additional which will mean remodeling the front portion of the house only and the plumbing fixtures. The kitchen will eventually be the bathroom, the bedroom the kitchen, while the present combination living and dining room with its additional frontage will be divided into two bedrooms and also a living and dining room. The plumbing fixtures have been so arranged that there will be little trouble in remodeling this feature.



Foundation Plan



Main Floor Plan



The Bungalow of a Landscape Architect—The Dining Room as Seen from the Living Room

Viewing the house as it stands at present, the many interior and exterior features to be enumerated show the ideas of a man with a practical and artistic turn of mind. The plans of this bungalow were drawn by the owner, the building construction superintended by him, while he also installed his own heating plant. These activities played an important part in the low cost of the structure, which in even figures is placed at $2,800.

Noticeable features of the exterior are the greenhouse which extends no less than 8 ft. beyond the building on its south side, the hotbeds situated at the southeast corner, the cobble-stone, concrete-capped chimney stack, all harmonizing with the green-shingled roof and the rough brown spruce siding. All exterior framework is painted white. The living room is splendidly lighted by large windows at the south and west sides, while the position of the greenhouse and hotbeds also assures them plenty of light and sun.

The combination living and dining room has dimensions of 24 x 10 ft. and is reached directly from the front porch. The kitchen and bedroom communicate, as will be noticed from the accompanying floor plans, the measurements of these rooms being 13 x 11 ft. and 9 x 11 ft., respectively. The bedroom has a spacious closet with a mirrored door, lighted by a window on the east side. In the floor of the closet is a trap-door leading to the basement. This was provided so as to be able to reach the basement without having to go to the rear entrance, this being the only means of access.

The kitchen is equipped with a china closet, with leaded glass doors and brass hardware. Beneath the china closet is a sideboard with numerous drawers and cupboards, the fixture being 3 ft. high, 7 ft. long and 18 in. wide. A medicine cabinet has also been provided as shown on the plans.

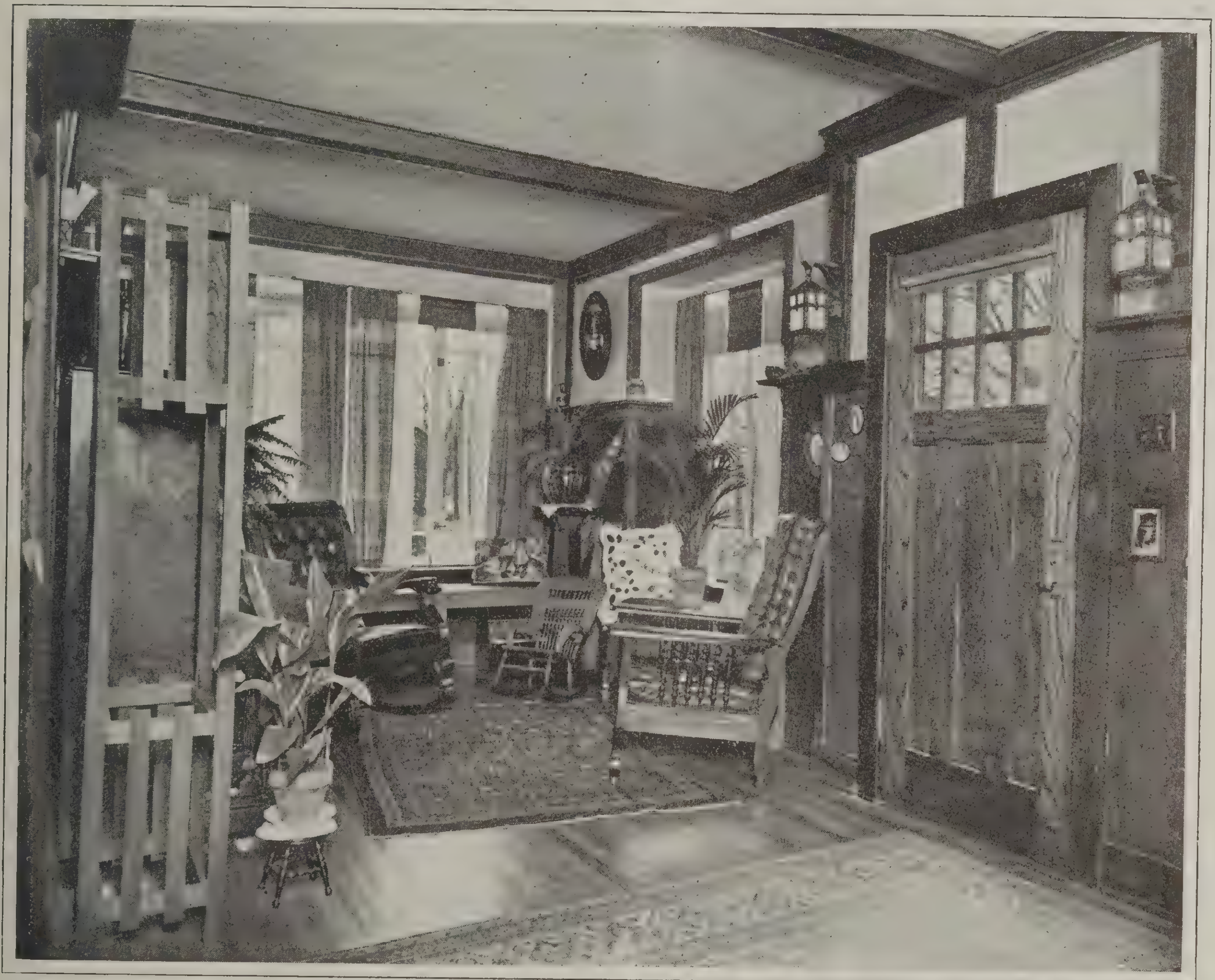
The temporary bathroom is small and occupies the corner of the kitchen, its equipment being a "Prospero" closet and a sitz bath. The kitchen has a 48-in. sink with 17-in. back, supported on enameled iron legs, the right leg having a seat attached. This fixture is of a type made by the Republic Manufacturing Co., of Chicago, Ill., while the bathroom fixtures, the three-section laundry tray in the basement and the hot water tank were supplied by the Wolff Manufacturing Co., Chicago.

The building has foundations of concrete, composed of a mixture of one part Portland cement, three parts sand and five parts gravel. The concrete piers are 10 in. and the corner posts resting thereon 6 x 6 in. The basement floor is also of concrete composed of the same mixture as the foundations. The chimney has 8 x 12 in. tile lining, while above the roof line cobble stones have been imbedded and the cap finish of concrete.

For the framing yellow pine and hemlock are used. Over the sheathing is a layer of building paper, this in turn being covered with No. 1 rough spruce 1 x 6 in., dressed and matched, shiplap. All corner posts are 6 x 6 in., inside studs 2 x 4 in. placed 16 in. on centers, floor joists 2 x 10 in. and rafters 2 x 4 in., also spaced 16 in. on centers.

Shingles for the roof are of stock size Star A cedar brand, exposed 4½ in. to the weather, and prior to being laid were dipped in Cabot's green creosote stain. The shingles above the spruce siding are undipped. All floors throughout are double, No. 1 hemlock being used for rough work and the finish floors are of oak. Two coats of shellac were applied to the oak floors and they were then given a final coat of wax.

The interior trim is of cypress and oak, the


The Bungalow of a Landscape Architect—The Living Room as Viewed from the Dining Room End of the House, Showing Recessed Window and Main Entrance Door at the Right

former being used round the doors and window casings. All interior trim is fastened with brass screws so that it can be easily detached when alterations take place. The doors are of oak, the front door being 1¾ in. thick and the remaining doors 1½ in., all dull finished. The windows are 1 in. thick, with brass catches at the top and bottom.

All plastering is two-coat work and the painted walls are stippled. The ceilings are cream tinted and the bedroom walls are tinted blue. The woodwork in the bathroom and kitchen is painted three coats of white paint and a final coat of white enamel.

Proper connections for gas supply and electric lighting have been made in accordance with local requirements, the fixtures being distributed as shown in the accompanying illustrations. Porch lights have been set each side of the doorway.

The building is heated by a hot water system with a No. 185 sectional furnace, manufactured by the John C. Moninger Co., of Chicago., Ill., and fitted with necessary gauges, etc. In the firepot is a coil for supplying hot water to the various faucets, connections being made with a 30-gallon tank at the side of the furnace. Mains running to the various radiators are of 3 in. diameter and to the green house 2-in. mains are provided, with return pipes run in a trench in the basement floor. In the living and dining rooms radiators of the low type are used, these being installed beneath the seats in the windows which give out upon the porch. The remaining radiators are of the standard upright type.

The green house is 10 ft. long and 8 ft. deep, the wood framework being securely built on the concrete foundations. The floor is of brick with a top covering of small gravel. Pipes for heating are run overhead around the framework and returns are conveniently placed on the floor and run in a trench in the basement floor back to the furnace. At its highest point the green house is 7 ft. high, sloping down to meet the short uprights on the south foundation wall. Two large skylights have been provided, and a doorway at the side leads to the hot beds. All framework on the greenhouse is securely fixed, while that of the hot beds is removable.

The bungalow here illustrated and described is known as the "Little Wood" house, being situated on Park avenue, River Forest, Ill., and is owned by Walter C. Littlewood.

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Another Theatre for New York

Plans are under way for another amusement building to be erected in what has become known as the "theatre block" in New York City. It is intended to occupy a site 80 x 160 ft., in West 42d Street, between Broadway and Eighth Avenue, will be 16 stories in height and constructed of hollow tile and steel. It is estimated to cost something over $400,000, and preliminary plans have been drawn by the Hoffman Company of Philadelphia, Pa. It is interesting to note that there are now eight theatres and one "movie" in this block, and it establishes a theatrical record for a single block anywhere in the city.

Competition in Model Village Houses

A series of competitions being conducted by the Minnesota State Art Society has to do among others with "a model village house" the cost of which is not to exceed $3,000. The jury having the matter in charge has announced the winners in this competition as follows:

First prize, $200, to Lawrence A. Fournier of 3505 Sheridan avenue, North, Minneapolis, Minn.

Second prize, $125, to Marion Alice Parker, 516 Fourth avenue, Southeast, Minneapolis, Minn.

Third prize, $75, to Harry Firminger, 290 University avenue, St. Paul, Minn.

Fourth prize, $50, to Frederick S. Stott, Capital Bank Building, St. Paul, Minn.

Fifth prize, $25, to Roy Childs Jones, University of Minnesota.

Sixth prize, $25, to Ralph Mather and James A. Burner, McKnight Building, Minneapolis, Minn.

The jury which passed upon the drawings submitted in this competition was notable in its composition. It included O. C. Simonds, Chicago, president of the American Institute of Landscape Architects; Robert Spencer, Chicago, fellow of the American Institute of Archittcts; Thomas Holyoke, St. Paul, vice-president of the Minnesota Chapter of the American Institute of Architects; A. F. Woods, dean and director of the agricultural department of the University of Minnesota, and Mrs. Clarence L. Atwood, of St. Cloud, president of the Minnesota Federation of the Women's Clubs.

The model house, to cost $3,000, is a straightforward type of stucco-veneered dwelling. The features in the house are that the walls should be concrete 12 in. thick, carried above grade, and the exterior walls covered with a rough pebble dash cement plaster of a light color. The basement is lighted by windows of large area. The house has six rooms and bath, a sleeping porch and all modern conveniences.

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Lumbermen's Exchange for Chicago

A sixteen-story office building will be erected at the southeast corner of La Salle and Madison Streets, Chicago, Ill., and will be occupied principally by lumbermen and those connected with allied trades. It is planned to finish the construction within one year, and the cost has been conservatively estimated at $1,250,000. The structure will be known as the Lumbermen's Exchange Building, and will front 101 ft. on Madison Street and 135 ft. on La Salle Street.

The exterior finish will be of brick with terra cotta trimmings, and the interior finish of mahogany and white marble. The equipment will be modern in every respect. Plans are being finished by Holabird & Roche, Chicago, Ill.

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The first rivet in the new Equitable Building in lower Broadway, New York City, was driven on March 10. The steel structure, already three stories below the street level and one above, was held together by steel bolts.

Architects and Builders as Witnesses

Their Legal Status as Experts—Experience as an Essential Element—When Their Opinions Are Improper

By A. L. H. Street

On account of their technical knowledge and experience, architects and builders are recognized by the courts as constituting an independent class of expert witnesses, and, as such, being qualified to give *opinions* before juries on subjects relating to the construction of buildings. This class of testimony constitutes one of the exceptions to the general rule of law that a witness must be confined to a statement of *facts;* it being, ordinarily, the exclusive province of the jury to draw conclusions from the facts involved in the particular case.

Thus it has been held by the New York Court of Appeals that persons who have made a special study of the strength of materials and the proper mode of building structures to sustain weights may testify whether a structure has been built sufficiently strong to withstand the strain which would be put upon it in using it for the purpose for which it was intended. (Fox vs. Buffalo Park, 57 Northeastern Reporter 1109.) And the California Supreme Court has decided that an expert builder may give an opinion as to the weight of timber, the amount of the strain to which a given piece of timber can be subjected before breaking, the difference of resistance of such strain between a cylindrical and a square piece of timber, and between different kinds of lumber, etc. (Callan vs. Bull, 45 Pacific Reporter 1017.)

Qualifications Must Be Shown

Where a question was raised in a lawsuit whether a builder had constructed a building in a skillful and workmanlike manner, it was proper to refuse to permit a witness who had examined the house to testify whether there were defects in the construction, if the witness had not first shown his qualifications to give such opinion. (Massachusetts Supreme Judicial Court, Campbell vs. Russell, 1 Northeastern Reporter 345.) And it was declared by the Delaware Superior Court that a builder and contractor who had had no experience in the construction of buildings where heavy machinery is used was not qualified to give his opinion merely from an examination of such a building as to whether it was suitable for the purpose for which it was constructed. (Huber vs. Jackson & Sharp Company, 2 Hardesty 97.) A builder who had had special experience in constructing coal stages was held by the Maine Supreme Judicial Court to have been properly permitted to testify as to how certain parts of such a stage should be constructed, but, in the absence of special experience in proving the tensile strength of cable, not to have been qualified to give an opinion as to the strength of a particular cable. (Caven vs. Bodwell Granite Company, 54 Atlantic Reporter 851.) In a New York case architects were held to have been properly permitted to state whether an unprotected furnace pit in a cellar was properly constructed. (Behsmann vs. Waldo, 74 New York Supplement 929.) And, in the same state, the Court of Appeals decided that an architect was properly permitted to give an expert opinion as to whether certain work could be done within a certain time without dangerous haste.

Another limitation upon expert testimony of this class is that an architect or builder is not properly permitted to give an opinion on a question which is to be ultimately determined by the jury. Thus experts in the construction of buildings are not permitted to state whether a certain building has been erected in substantial compliance with the contract for its construction, or in a good and workmanlike manner, when that is the principal issue in the case. (St. Louis Court of Appeals, Zimmerman vs. Conrad, 74 Southwestern Reporter 139.) Nor is an opinion admissible if all the underlying facts can be made clear to the jury.

The status of architects and builders as expert witnesses was recognized by the Missouri Supreme Court in the case of Turner vs. Haar, 21 Southwestern Reporter 737, but it was decided in that case that witnesses were improperly permitted to give opinions that a wall might have cracked as a result of defects in it or the foundation, since it appeared that the cause of the cracking was susceptible to direct proof. The court said: "These witnesses were shown to have been engaged in the business a number of years, and are presumed to have acquired special knowledge of the business. Their knowledge, skill and experience were not tested further by cross-examination, and we think they were prima facie qualified to give their opinion on any question in respect to the construction, strength and sufficiency of the building which may have been a proper subject for opinion evidence.

When Opinions Are Improper

"The opinion asked of these expert witnesses as what produced the crack between the walls would have been proper enough in an issue involving the effect upon the wall a sinking of the foundation would have produced; but in the issue here the condition of the walls, and the sufficiency or insufficiency of the foundation, were facts susceptible to direct proof; and it was improper to get before the jury, as proof that the wall was defective, or the foundation had given away, an opinion that the separation of the walls may have resulted from these facts and conditions."

Before an architect or builder will be deemed qualified to give an opinion based on facts, a knowledge of which he derives from other witnesses, he must, of course, be put in possession of all the facts, as ascertained or supposed, on the question about which the inquiry is made. An opinion given upon a partial statement of facts would be of no value. Applying this principle, the Missouri Supreme Court said in the case last cited: "What effect the vibrations caused by running the machinery on the third floor may have had in weaknening the building and rendering it insecure and dangerous, was certainly a subject beyond the general knowledge of mankind, and a proper one for opinion evidence. In this case, however, the evidence was worthless, and improperly admitted, for the reason that the witnesses were not put in possession of all the facts necessary to enable them to form an intelligent opinion. The answer of one of the witnesses, 'If the vibration was great enough it would throw the building down,' forcibly illustrates the importance of the rule that requires an opinion of a witness to be predicated upon all facts which may influence it."

In an Illinois case, plaintiffs, architects, sued to recover damages on the theory that they were wrongfully prevented by the owner from performing services contracted for. For the purpose of showing that plaintiffs were by the contract claimed to have been made with the defendant to superintend the construction of the building, they introduced evidence to prove a custom that the employment of an architect to make plans and designs for a building carried with it an employment to superintend the construction. In this situation it was held by the Illinois Supreme Court to have been improper on the part of the trial judge to exclude testimony offered by defendant owner's witnesses, who were builders and contractors, to show that there was no such custom. Speaking of the qualifications of these witnesses, the Supreme Court said: "The witnesses * * * had been largely engaged in building and contracting in Chicago, and if there was such a custom they must have known of it. It could not be wholly confined to architects, but must, if it existed, be just as well known to builders and contractors, without whom there could be no opportunity for the existence of the custom. The concurrence of the builder or contractor was just as essnetial as that of the architects. It was not to be settled by special skill or science, but by a knowledge of what the architects did under a particular form of employment, and anybody who had any experience in the matter was competent to testify." (Wilson vs. Bauman, 80 Illinois Supreme Court Reports 493.)

Art of Beautifying the Home

Art Director C. Valentine Kirby of the Pittsburgh Public Schools is instructing the children in the art of beautifying the home. His assertion is that "Nature expresses the greatest simplicity," and he wishes to eliminate all things that are not useful and beautiful. Some of the home decorations as given the children in their classes are as follows:

Floors and Woodwork.—Better grade with soft stains—not highly polished. Floors darker than walls and ceiling. Woodwork related to other furnishings.

Walls.—We must remember that these are backgrounds or settings for the pictures, furniture and of persons; therefore, they should not be flashy or spotty, but plain, subdued and restful. Use vertical stripes to make a very low room appear higher studded. Avoid vertical stripes in the high rooms, but rather horizontal lines and space divisions. There is economy, too, in papers that reflect rather than absorb artificial light.

Portieres.—To bar out drafts they should not be elaborately festooned but hang in vertical folds, softening the lines of the woodwork. They should be simple in design and color and relating to the other furnishings.

Ceilings.—Should be lighter in key than the floors and walls and perfectly plain like nature's clear sky.

Director Kirby has issued a pamphlet explaining his principles for home beautifying, and among other things he advises furnishing north rooms in warm colors—soft orange, browns, tans and the like, and south rooms in grayish greens, blue and violet. "Manufacture," says Mr. Kirby, "is largely influenced, even controlled, by the preference and selection by purchasers of material products for home use. This plan is presented with the trust that it will be of assistance to the teacher and without offense to the very poorest of us. Wealth is no synonym for fine taste—simple, durable, well-chosen objects of real comfort may make the cottage a more delightful abode than the palace."

A Novel Theater

An unusual feature in connection with a theater building about to be erected in the center of the amusement district of New York City is that it will have a seating capacity of only 299. This oddity, so to speak, is due to the desire of the projector of the enterprise to build a theater and yet escape the rigorous exactions of the building laws which confine all sorts of public places of this nature having more than 300 seats to restrictions as to how they shall be built and compel the leaving of a certain percentage of the lot for courts providing exits around the exterior of the building.

The site for the new theatre measures 41.8 x 101½ ft. and is located a little east of Seventh avenue on West 49th street, the architects being Murphy & Dana, of 331 Madison avenue. The growth of places of amusement is strikingly shown by the fact that within an area of five blocks in this district there are twenty or more theatres.

A Chicago Type of Apartment House

One of the more recent apartment operations in the city of Chicago affords a fair illustration of the way modern builders and architects are treating the housing question. It in reality is four separate buildings occupying an area 150 ft. square and will contain 15 apartments of from five to ten rooms, each suite having an individual sun parlor, sleeping porch and a bath attached to every bedroom.

The buildings which surround a terraced court centered with a fountain, have an underground tunnel for service and public utility piping. The architecture is in the English Tudor style, the façades being dark red brick with terra cotta trimmings topped by a roof of harmoniously colored slate.

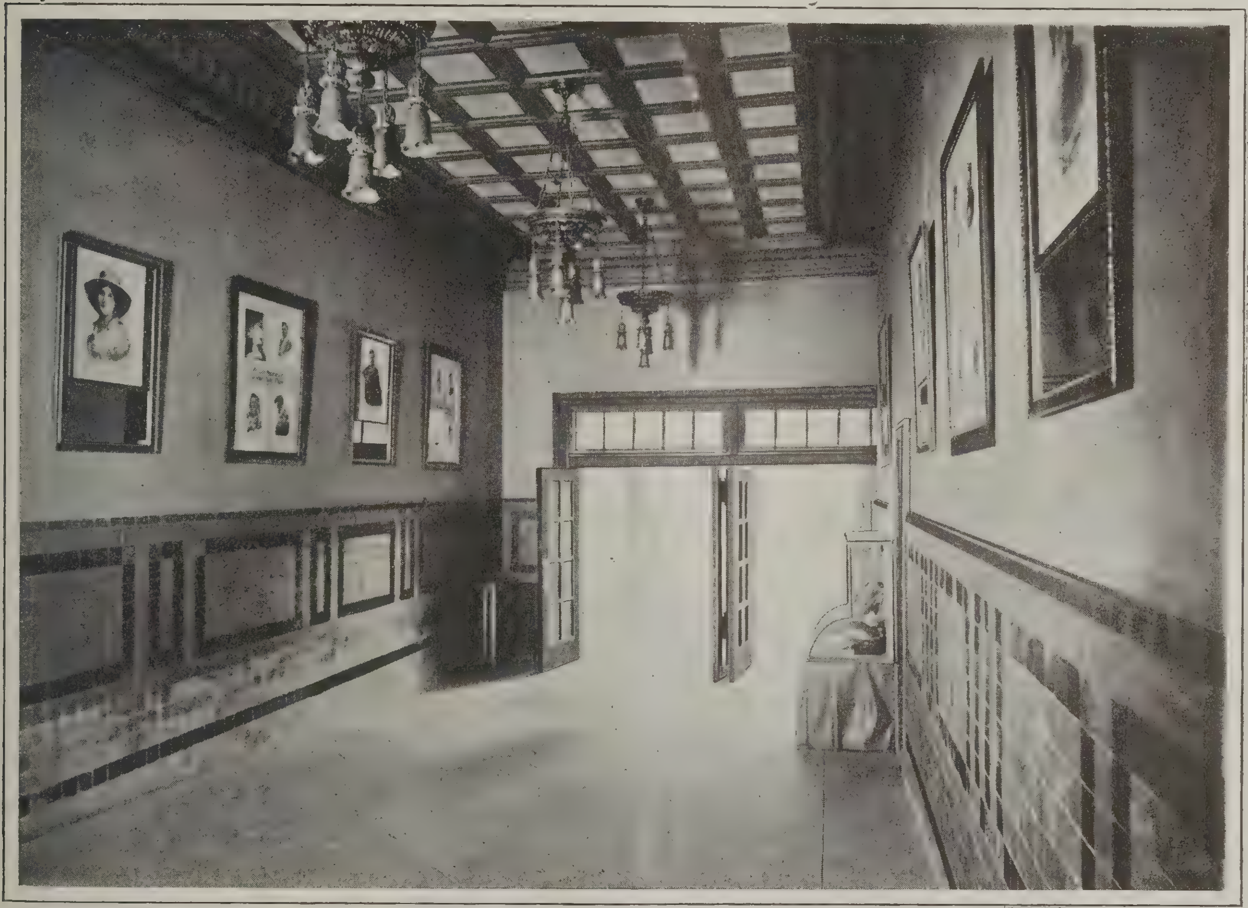
A Fireproof Moving Picture Theatre

Structural Details and Description of Heating and Ventilating Equipment of a Cinematograph Playhouse

A MOVING picture theatre in order to be in every way satisfactory to its patrons must be well heated, well ventilated, provided with proper fire exits; must be equipped with comfortable seats and the floor must be so constructed that it can be easily cleaned. These features are embodied in the moving picture theatre here described, and located in the Borough of the Bronx, which is a part of Greater New York. It was designed to meet the requirements of the present city ordinance relative to buildings of the character named. The space requirements of a moving picture theatre of fairly large size are such that the depth of the average city lot is frequently insufficient to permit of the placing of the auditorium so that its greater dimension is perpendicular to the street line. The design of the theatre here described makes allowance for this contingency, although in the present case a consideration other than that of the depth of the lot led to the placing of the auditorium in the position shown. As will be seen by reference to the floor plan, the theatre is entered through a foyer the length of which is at right angles to the street. The length of the main auditorium is parallel to the street, and the space between it and the street at the left of the foyer is occupied by stores. On the farther side of the main auditorium is an open air addition entered through the auditorium itself, and intended for use during the summer months. The store buildings are not shown in the plan of the structure here presented.

The façade, constructed of brick and stone with galvanized iron cornice was arranged for a series of four panels to contain Faience tile inserts, manufactured by the Miller Mosaic Co., of Trenton, N. J. The main entrance is spanned by a graceful brick arch. The architectural effectiveness of the design is somewhat marred by the large and elaborate electric sign which projects above the arch as shown in one of the pictures herewith. The sign, itself, however, is a fine piece of work, and is undoubtedly effective from an advertising standpoint. At night the brilliant illumination from the sign is greatly amplified by the presence of two flaming arc lamps suspended at each side of the entrance.

The foyer entered through swing doors of yel-

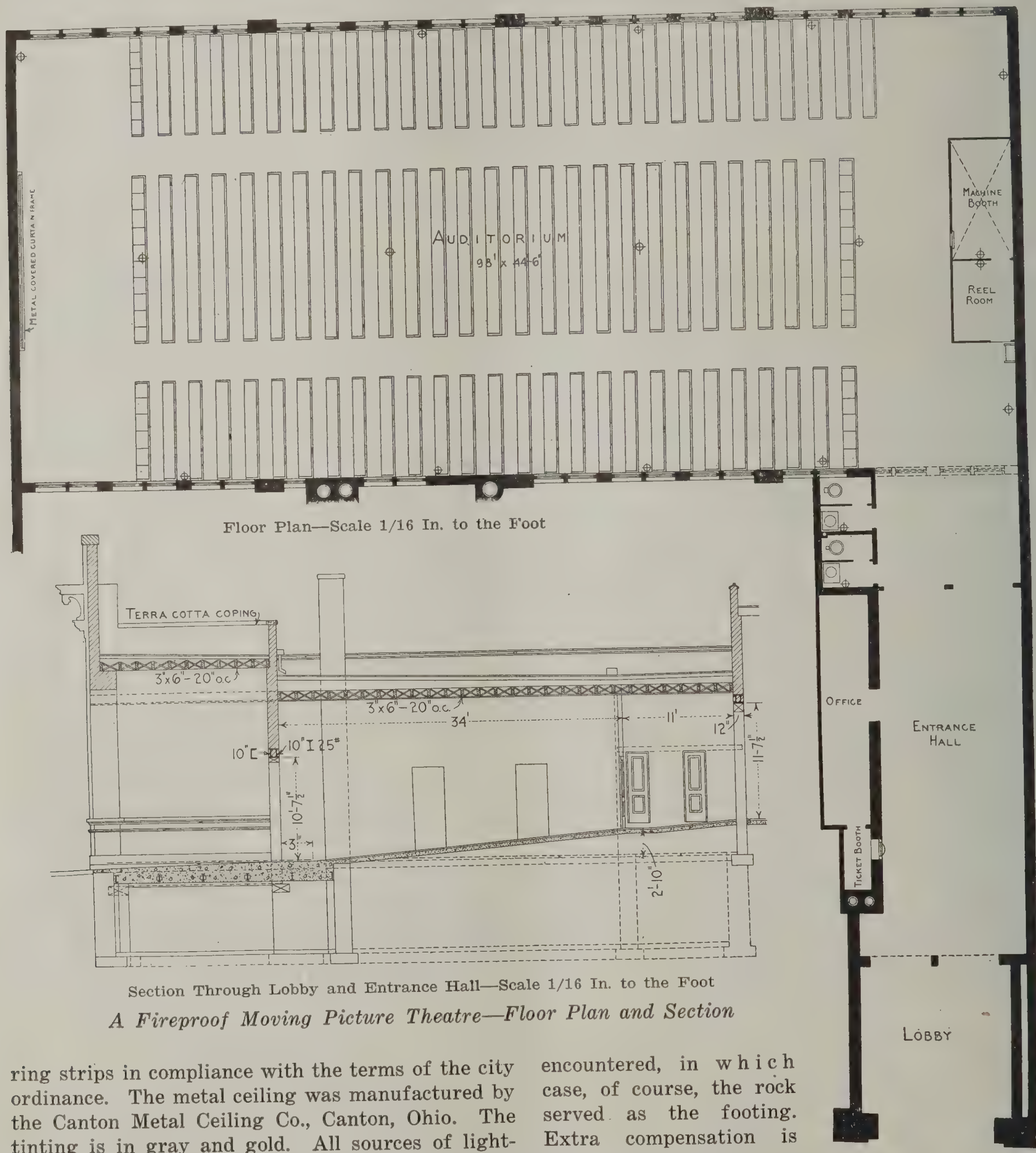


A Fireproof Moving Picture Theatre—View in the Foyer of the Building—Goldner & Goldberg, Architects, New York City low art glass design in eight panels, has a semicircular coffered ceiling the panels in which are about 16 in. square. The floor of the foyer is of concrete with a finish layer of colored Portland cement marked out in square panels. The floor of the vestibule is tiled and a wainscoting of vitreous tile in panel design covers the side walls of the foyer to a point nearly half way to the ceiling. Illumination is furnished by three hanging basket chandeliers with five pendants each. The lamps are screened by iridescent glass shades.

The ceiling of the auditorium is constructed of stamped metal nailed to metal covered wood furring strips in compliance with the terms of the city ordinance. The metal ceiling was manufactured by the Canton Metal Ceiling Co., Canton, Ohio. The tinting is in gray and gold. All sources of lighting are concealed. The ceiling chandeliers are indirect lighting fixtures separately controlled and these are supplemented by a series of side wall brackets with amber colored shades. The wall brackets are two-light fixtures. The ceiling chandeliers are six-light fixtures. The walls of the auditorium are laid off in panels framed by raised gilt mouldings. There is a cement base 6 in. in hight all around the walls of the auditorium, and the floor is of concrete with a pitch of one foot in twenty. The chairs are of American Seating Co. make and are staggered so that a complete view of the picture screen can be gained from any seat in the house. The screen is of white plaster surrounded by an elaborate gilt frame.

Beneath the screen is installed a band organ which has various up-to-date attachments imitative of drum, chimes, etc.

Referring to the details of construction, the footings are of concrete and are spread to 4 ft. and made 16 in. in thickness, except where rock was encountered, in which case, of course, the rock served as the footing. Extra compensation is made at places where piers are indicated. All concrete used was composed of one part Portland cement, two parts sand and five parts broken stone. All cement mortar for the foundations was composed of sharp sand and Portland cement in the proportion of one part cement and three parts sand, with about 10 per cent hydrated lime. Cement mortar for the brick

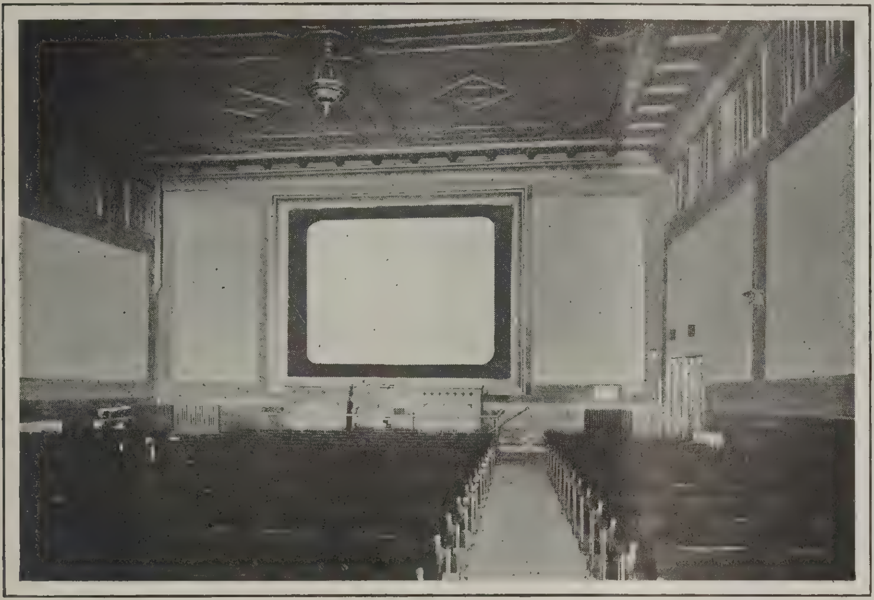


Floor Plan—Scale 1/16 In. to the Foot

Section Through Lobby and Entrance Hall—Scale 1/16 In. to the Foot

A Fireproof Moving Picture Theatre—Floor Plan and Section was composed of one part hydrated lime, three parts Portland cement and nine parts sand. The lime mortar was composed of sharp sand and lime in the proportion of 4 to 1. Great care was exercised in the mixing to render a first class job.

The cellar to accommodate the heating plant was excavated below the foyer, and above this space, the concrete floor rests on cinder concrete arches spaced about 6 ft. on centers and supported on 8-in. 18-lb. steel I-beams. All door and window openings are spanned by steel I-beam and channel lintels.



A Fireproof Moving Picture Theatre—View Looking Toward the Picture Screen

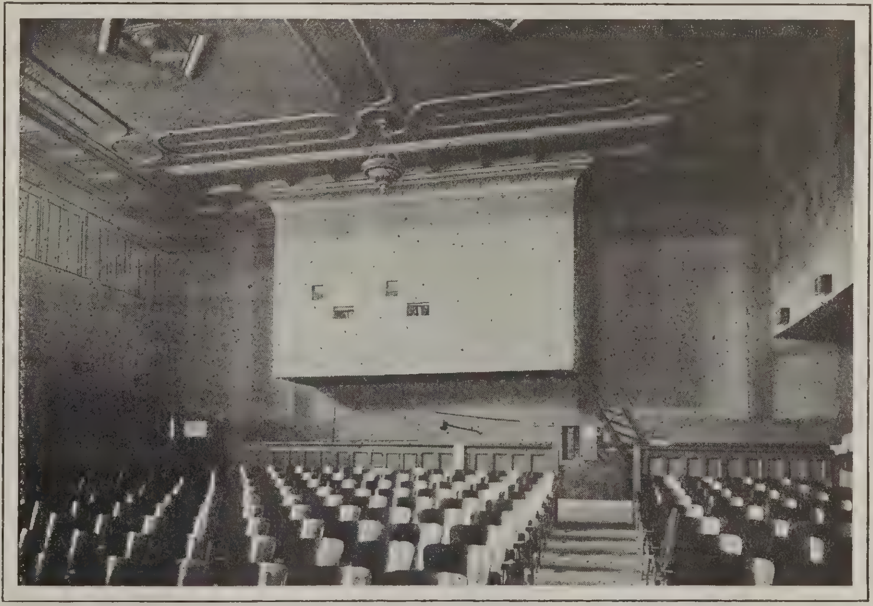
The roof is spanned by three 24-in. Bethlehem steel girders weighing 120 lb. to the foot on a span of 44 ft. 6 in. The span of the roof beams resting on the top of the girders above mentioned is 24 ft. 6 in. These roof beams are laid level and are of 3 x 10 in. spruce, spaced 16 in. on centers in order to accommodate plaster boards. Otherwise they would have been spaced 20 in. Since the roof beams are laid level on the floor flanges of the roof girders, the roof proper is blocked up on top of the beams more than the depth of the girders and of a sufficient amount to allow for a proper fall to the roof leaders.

The floor of the auditorium is composed of a base of cinder, sand, and Portland cement concrete 4 in. in thickness, with a 2-in. top coat of Portland cement and grit. This top coat was made 2 in. thick in order to afford a fastening for the seats. The latter are secured to the floor beams by expansion bolts and a thin top coat of the usual thickness would have been insufficient to hold these bolts.

The moving picture booth and reel room are of fireproof construction, the steel angle frame of which is suspended from steel beams in the roof framing. The entire booth construction is very rigid and substantially braced in order to eliminate vibration. The booth is reached from the floor of the theatre by an iron stairway 24 in. in width fitted with a hand rail, and kalamein doors lead into the reel room and the booth. The latter is arranged to accommodate two machines and covers a space 6 ft. x 12 ft. There is a large ventilating skylight over the booth with sash louvres on all sides and glazing of wire glass. The machine slide openings are 6 x 12 in. and placed 2 ft. 9 in. above the floor. The lookout slides are 6 x 8 in. and 4 ft. 3 in. above the floor. These openings are all provided with asbestos shutters controlled by fusible link attachments and work automatically. The frame of the booths is covered both inside and outside with metal lath and two coats of King's Windsor plaster. The floor of the booth is constructed of a 4-in. flat arch composed of a 1 : 2½ : 6 mixture of concrete with a reinforcing of 5/16-in. round rods spaced 12 in. on centers.

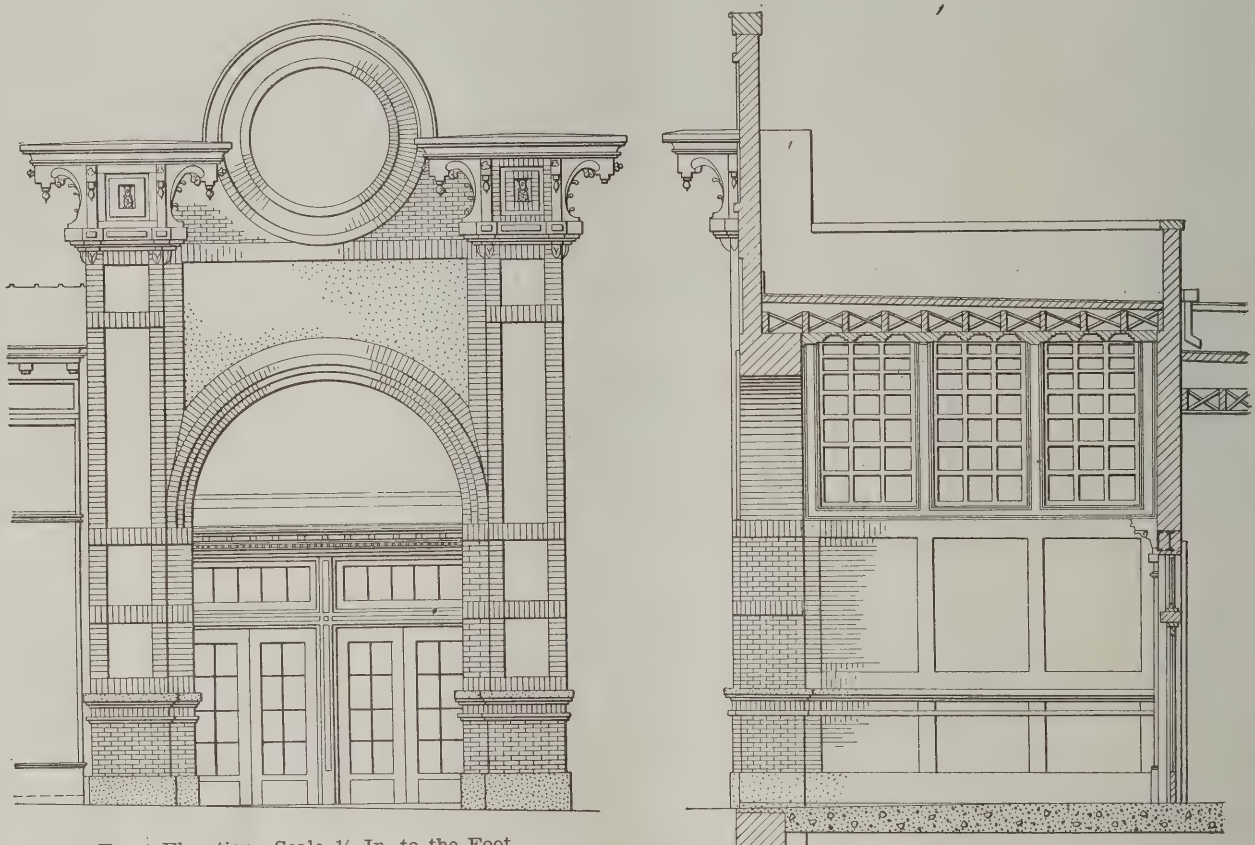
The only wooden doors in the structure are located in the vestibule. The latter are casement doors 2½ in. thick and with veneer of oak. All other doors are kalameined and are 2 in. thick, the work being known as white metal.

The window frames are constructed of 2½ x 6-in. planks and have sash arranged to be hung on top and bottom pivots. The entire series of windows on each side is arranged to be opened and closed by a system of worm gears, all controlled from one pilot wheel. The ventilation which is possible with the cross draft from these windows in



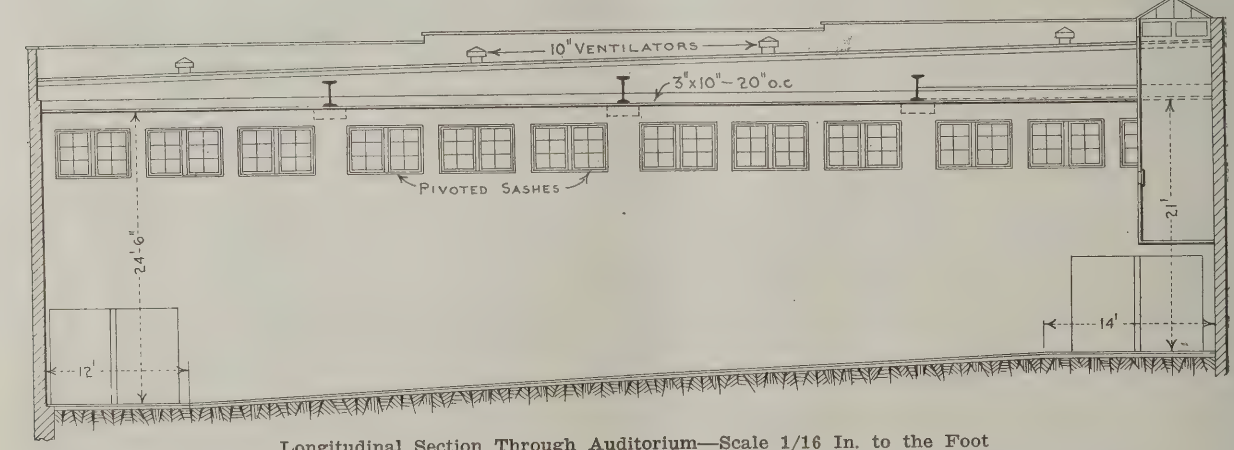
View in Auditorium of the Theatre Looking Toward the Machine Booth the side walls is generally adequate, but a system of artificial ventilation is also provided.

The New York City ordinance controlling the erection of moving picture theatres requires that those having more than 200 cu. ft. of air space for each person, or which have outside windows and doors, the area of which is equal to at least one-eighth of the floor area, shall be provided with artificial means of ventilation which shall be in operation when the outside temperature requires the windows to be kept closed, and which shall supply during the time the audience is present at least 500 cu. ft. of fresh air per hour for each person. When the artificial ventilation is not in operation, ventilation by means of open doors and windows shall be sufficient to provide each person with 500 cu. ft. of fresh air per hour. The seating capacity of the building under discussion is 600 persons.



Front Elevation—Scale ⅛ In. to the Foot

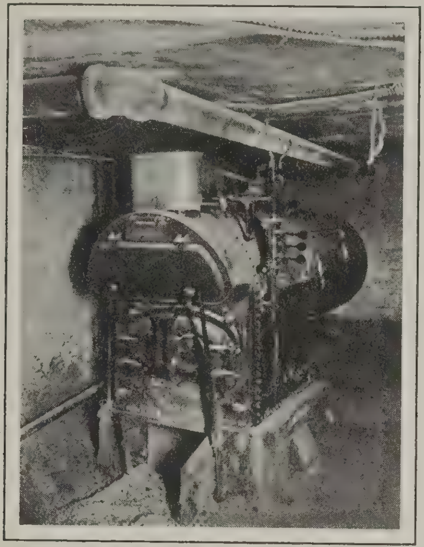
Section Through Centre of Entrance—Scale ⅛ In. to the Foot



Longitudinal Section Through Auditorium—Scale 1/16 In. to the Foot

A Fireproof Moving Picture Theatre—Various Details Showing Constructive Features

The legal requirements therefore demand an exhaust fan having a capacity of 300,000 cu. ft. of air per hour, or 5,000 cu. ft. of air per minute. This artificial ventilation is provided for in the present case by one 30-in. fan located near the ceiling in the corner of the building diagonally opposite to the entrance. This fan was manufactured by the Ilg Electric Ventilating Co. The fan wheel is of the Blackman type. The motor is an alternating current single-phase, 60-cycle machine. The fan is provided with an Ilg automatic shutter mounted in a panel on the outside of the fan opening. The latter is intended to prevent the ingress of rain, snow, etc., when the fan is not in operation. This fan has a capacity of 9,000 cu. ft. of air per minute, and, as the ordinance requires but 5,000 cu. ft., per minute, the rated capacity is in excess of the requirements. Under actual operating conditions it is estimated that this fan delivers about 7,500 cu. ft. of air per minute. A sufficient amount of air leaks in through the entrance and other openings to create favorable conditions for the exhaust. There are a series of fan outlets arranged along the walls underneath the lighting brackets to provide a means for keeping the air in circulation throughout the building.

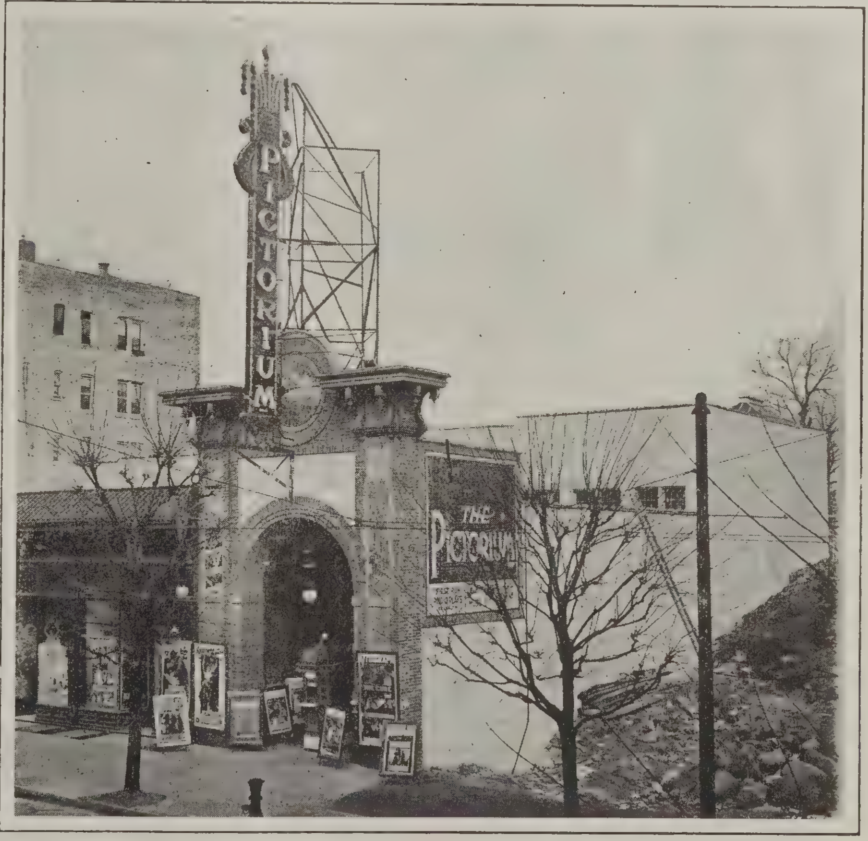


A Fireproof Moving Picture Theatre—
The Low Pressure Steam Boiler

The heating is direct radiation of the one-pipe gravity return type connected to a low pressure boiler as shown in the illustration at the top of this page.

Toilet rooms are equipped with wash-down closets with brass floor plates and brass flanges and equipped with 2-in. Never-Slip seats attached to the water closet bowl with heavy nickel-plated brass post hinges and connected to the soil line by a 4-in. lead pipe branch vented by a 2-in. galvanized iron connection. These closets are flushed by means of heavy nickel-plated brass Flush-O-Valves, connected to 1¼-in. risers, controlled by gate valves. All supplies are concealed and all exposed fittings are nickel-plated brass. The equipment includes two wash basins of the oval bowl type made by the Standard Sanitary Manufacturing Co. The floors of the toilet compartments are tiled, and there is a marble base 6 in. high running around the walls at the floor line.

This theatre, known as the "Pictorium," was designed by Goldner & Goldberg, architects, of 349 East 149th Street, New York City, and was recently erected under their supervision for the Arc Realty Co., also of New York City.



General Outside Appearance of the Fireproof Moving Picture Theatre

Officers of Brick Makers Association

At the twenty-eighth annual convention of the National Brick Manufacturers' Association held in New Orleans, La., the first week in March, the following officers were elected for the ensuing year:

Pres...........Eben Rodgers, Alton, Ill.
1*st Vice-Pres*......C. P. Mayer, Bridgeville, Pa.
2*nd Vice-Pres*..Chas J. Deckman, Cleveland, O.
3*rd Vice-Pres*..Fritz Salmen, New Orleans.
Treas..John W. Sibley, Birmingham, Ala.
Secy...Theo. A. Randall, Indianapolis, Ind.
Asst. Secy....A. M. Wallace, Indianapolis.

The twenty-eighth annual banquet took place at the Hotel Grunewald on Thursday evening, March 5, when covers for 260 guests were laid.

◆

Reports covering building operations in leading cities of the country for February indicate practically the same amount of capital involved as for the corresponding month in 1913. There are, of course, the usual fluctuations in different cities, some, like Greater New York, showing a heavy decline while others report a gratifying increase.

◆

American architecture has been discovered at last, though it was necessary to go to Europe to do it, says a writer in *Construction Details.* Returning tourists assure us when they were at the "movies" they could always recognize an American picture by the buildings. The corner of a porch, plank steps, or a roof were all that was necessary to establish the nationality of the scene.

When the Builder Mixes His Concrete

What a Practical Man Has to Say on the Subject Considered from the Woodworker's Point of View

By Hee H. See

MUCH has been written on the subject of concrete in the last few years; so much, that it scarcely seems possible there could be anything left to say, either new or original, interesting or instructive. Nevertheless, the writer ventures to hope that some portion of what he has to say may prove to be one of these four things to the reader. He wishes to state at the outset that the subject is taken up from the woodworker's viewpoint, and that it is nothing but a collection of hints, or notes, from the book of personal experience.

There are many small builders scattered around the country who may at any time find it necessary to mix and place a few yards of concrete with the help of unskilled labor, and it is with the desire to afford them a little general information along this line that this article has been written.

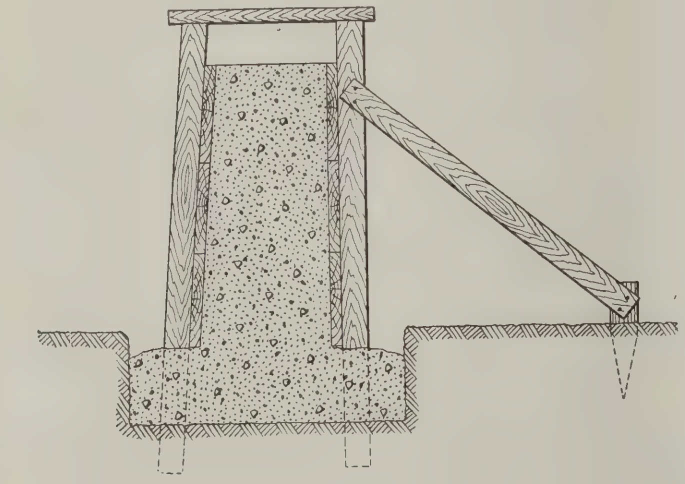


Fig. 1—A Vertical Section Through "Form" Showing Side View of the Bracing

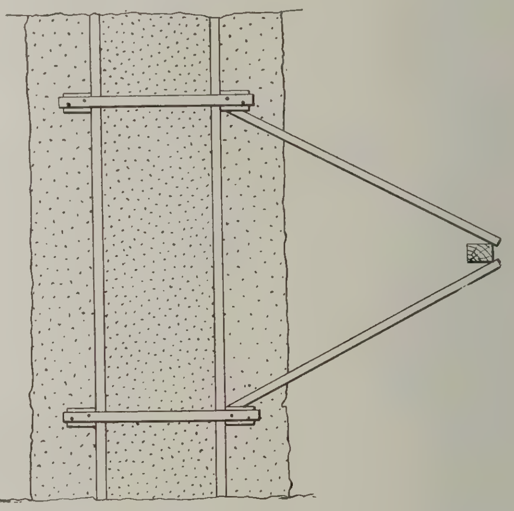


Fig. 2—Plan View of "Form" Showing Ties and Method of Bracing

When the Builder Mixes His Concrete—By Hee H. See

First, a few words on the subject of forms. Some years ago there was considerable discussion as to which was the best thickness of lumber to use for this purpose, some authorities claiming 2 in. material to be the best, because it required less bracing. Great strides have been made in the industry since then, however, and very seldom at the present day do we see anything heavier than ⅞ in. material being used.

While the 2 in. material has the one doubtful advantage of requiring less bracing, it has a dozen disadvantages regarding which there can be little doubt. Some of these are: double first cost; twice as much waste; takes twice as long to cut; requires larger nails, and is more than twice as heavy to handle, because the ⅞ in. stuff can be economically used in 6 in. or 8 in. widths, while 10 in. or 12 in. is the more economical width for the 2 in.

It makes the writer's back ache to the present day when he thinks of the amount of 2 in. plank he was compelled to use for form work in the days gone by. There are, of course, times when circumstances compel us to use the material that is at hand, but if new lumber is to be ordered, or if there is any choice, always select ⅞ in. material.

As a very general thing, no form lumber is especially ordered for the small amount of concrete work in the foundations of an ordinary dwelling house, the idea being to save on this item by utilizing some of the material that will afterward be used in the framework of the structure. It has been suggested that the floor joists be used for this purpose, but a moment's consideration will prove how impractical is that suggestion.

In a proper bill of material the various boards, joists, scantlings, etc., are ordered of a length that will work up the most economically, the floor joists being in all cases ordered of a length to suit the opening they are to span. Now, if there are any members of the framework of a house that require to run their full length in one piece, those members certainly are the floor joists. Any one who has done any form work knows how difficult it is to construct the most simple of forms without cutting lumber, and a word to the wise is more than enough.

Where double floors are to be laid in the house the proper material for the form work is the underflooring; when there are no double floors, use the roof sheathing. No matter how badly the forms are cut up, almost every piece of them can be used again for their original purpose, and that without detriment to the building. Sometimes, however, we have not even the roof sheathing, the roof being covered with shingle lath only 3, or at the most 4, inches wide. In this case it is better to order enough of a common grade of ⅞ in. lumber to make the forms, than it is to try to get along with a makeshift.

Use of this extra lumber can always be made for scaffolding and bracing purposes, and you may still use it up in the roof in place of some of the shingle lath, if so disposed.

Instead of 1 in. material ⅞ in. may be specified because all form lumber is better if dressed one side. This is not for the purpose of having a smooth side next the concrete, but to have all boards of equal thickness so as not to leave ridges in the wall where a thick and a thin board come together. In practice, we almost always turn the rough sides of the boards to the inside of the forms. In a low foundation wall, which will perhaps be almost entirely covered up with the grading, these ridges in the wall surface are of little consequence, but rough lumber, and lumber dressed one side are about the same price in most localities so that it is just as well to order the most suitable.

Having provided sheathing for the forms, something is still required for posts or uprights. The material to be used for this purpose will again depend upon circumstances. If the forms are less than 3 ft. high, we can sometimes use the lumber ordered for the bridging without having a great amount of waste; or we may find some broken or crooked pieces of joist that we can cut to the proper length and then split up for this purpose. For walls 3 ft. or more in hight, use the studding of the building, working these short lengths up afterward for door headers, bracing, bridging, etc.

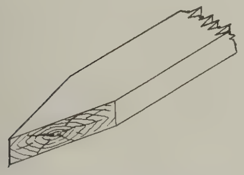


Fig. 3—Method of Pointing the Lower End of an Upright

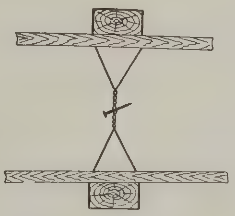


Fig. 4—Wire Tie for "Form"

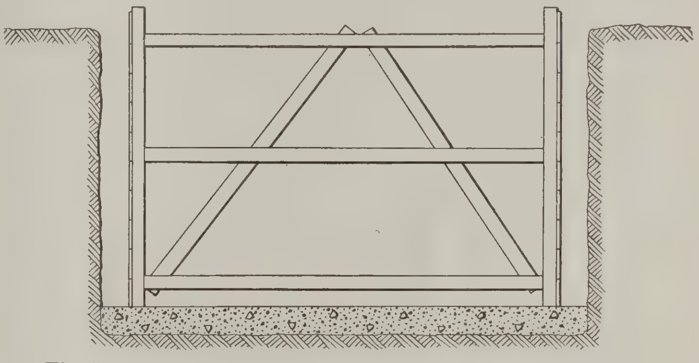


Fig. 5—A Method of Bracing "Forms" for Cellar Construction

When the Builder Mixes His Concrete—By Hee H. See.

Forms are erected in two different ways. They may be built directly in place, or built up in panels, and afterward assembled in their proper position to complete the form. Only experience can tell which is the best method under given conditions.

Fig. 1 shows a cross section, and Fig. 2, a plan of a simple form construction for small foundation walls. In erecting this form the trench is first dug the correct depth and width; a line is then stretched showing the outside upper corner of the wall. The uprights for the outside form (already pointed) are then driven into the ground in the proper position, one man holding the upright with a scrap of ⅞ in. material between it and the line, and another man using the sledge.

We usually give both sides of the wall a slight batter, as that makes the setting of the uprights easier, but if the outside of the wall is wanted plumb, the man holding the upright must also hold a level on it, to get the exact spot where the point of the upright enters the ground. Once it has been entered no further attention is paid to whether it is plumb or not, because if the foot of the uprights are in the right place, it is easy to bring the top of them to line afterward. This is the reason we stretch the line for the inner side of the form, or ⅞ in. from the uprights, so that if any of them are leaning a little forward, they will not throw the line out of place. When using a level to plumb the posts instead of putting a scrap of ⅞ in. stuff between the post and the line, we make a mark at the proper point on the upper end of the level.

The uprights are pointed on the edges only as shown in Fig. 3, and if the ground is extra hard we use a short piece of pointed steel rod to make an entrance for them. This piece of steel is called a "gad". It is driven 6 or 8 in. into the ground with a sledge and after being tapped a few times sideways, is removed and the upright easily driven in its place. After the uprights for one side are all in we put on the sheathing, commencing at the top and working downward. It is important that straight-edged boards be selected for the first row, because in this row it is not possible to spring crooked boards straight; they will merely pull the posts out of the ground.

With the sheathing all on, the outside form is lined and braced in position; short pegs or stakes are driven into the ground wherever necessary as shown in Figs. 1 and 2, and pieces of scrap material used for braces. If these pegs are driven at a point midway between two uprights as shown in Fig. 2, one peg can be made to serve for two braces; that is, when circumstances require a brace for every upright. It takes very little bracing however, to hold a form of the hight shown, if back and front sides are well tied together, and the concrete is not thrown in too carelessly.

After the outside form has been lined we set the posts for the inside one. For these we do not use a line but a short piece of stick, cut the correct length to go between the upright and the front form at the top. We always give the inside form a little batter and about the only thing requiring mention is, be sure and have the uprights opposite each other so that they may be easily tied square across the form. This is a point invariably overlooked by the novice and sometimes by those of more experience. In putting on the sheathing we start at the top as before, but instead of leveling lengthways, we level across from the front form. We generally use 6d nails for nailing the sheathing and only enough of them to hold it in place. This, of course, is for greater ease in removing the forms and preparing the lumber for other service. The two sides of the form are held together by nailing scraps of wood across the tops of the posts. These must be well nailed.

Wooden vs. Wire Ties

For forms of this hight, where only one tie is needed we find this wooden tie quicker and easier to apply than wire, because sometimes the two sides of the form are too close together and if wire ties are used, it is necessary to cut in a spreader to hold the form to its proper width. In higher forms, where intermediate ties are needed, the wire tie is about the cheapest and easiest to apply.

The wire tie is nothing but a short length of wire passed loosely around two opposite posts made fast on the outside, and then drawn tight by twisting the two strands together with a nail in the center. For intermediate ties, small holes must be bored through the form for the passage of the wire. A plan view of this arrangement is shown in Fig. 4.

Fig. 1 shows how the boards are left off at the bottom so as to give a spread footing to the wall. This of course can be arranged so as to give any hight or width of footing desired.

When Removing the "Forms"

This method of forming a footing leaves the uprights of the form embedded in the concrete. When taking off the forms, we usually cut off the uprights just above the concrete with saw or hand axe. If it is required to remove them entirely it is better when cutting the point on the bottom of them to make the bevel long enough to reach to the surface of the concrete. If this is attended to they can be withdrawn with ease. For concrete work below the ground such as cellar walls and the like, where conditions will permit, it is usual to omit the forms on the back of the walls, letting the sides of the excavation serve for this purpose. The inside forms are set up and braced in the usual way but if the excavation is not too wide, instead of bracing them from pegs driven in the ground, we brace square across from one form to the other. This method is illustrated in Fig. 5 where, because of the concrete bottom being put in first, it is not possible to drive in pegs for the braces.

Sometimes, owing to the loose nature of the ground, it is necessary to place forms next to the bank to prevent it caving in. It is often necessary to place and brace these forms as the excavation proceeds. After it is completed the inner forms are built in place, the braces of the outer form are removed or cut shorter, one at a time and the outer form is braced from the inner one by means of spreaders. The sheathing of the inner form is carried up 2 or 3 ft. at a time as the concrete is placed, so as to enable the workmen to remove the spreaders. As it would cost more to remove the outer form than the material saved would be worth, it is left in place and on that account the lumber used in it consists of any old stuff that can possibly be made to serve the purpose.

One more word and we are done with the subject of forms. When starting the form from the bottom, as in Fig. 5, it is not often necessary to cut the top board to the exact hight of the concrete. Let the board run past, mark a level line on it the correct hight and drive nails part way into the board along this line 18 or 20 in. apart. The concrete can easily be leveled off to the line of nails. The line alone will not answer for this purpose, because it is certain to be obliterated as the concrete is placed in the forms.

(To be continued)

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Convention of the New England Builders' Supply Association

The third annual convention of the New England Builders' Supply Association was held in the Bancroft Hotel, Worcester, Mass., February 26 and 27. Many interesting papers were read and discussed, various reports presented and the sessions concluded with a banquet in the ballroom of the hotel, where covers were laid for more than 150 members and guests.

One of the features of the convention was the decision to create the office of vice-president at large, this being done for the purpose of honoring R. H. Whitney of the B. F. Marsh Company of Worcester, who had declined after serving three years as secretary to again be a candidate for that office. The result of the election for officers was as follows:

President....Charles M. Kelley of Providence.
Vice-Pres. at Large...........R. H. Whitney.
Secretary....Frank H. Kingsley of Fall River.
Treasurer........S. F. Hammett of Taunton.

The following vice-presidents for the several states were also elected:

Maine...........	S. M. Hersey of Winslow Co., Portland.
New Hampshire..	E. D. Spencer of the Spencer Hardware Co., Keene.
Vermont.........	F. E. Kimball of Spaulding & Kimball, Burlington.
Massachusetts....	Frank Howard of the Frank Howard Co., Pittsfield.
Rhode Island.....	E. D. Allen of Manchester & Hudson Co., Providence.
Connecticut......	Frank H. Johnston of City Coal Co., New Britain.

These officers constitute the Executive Committee, and this committee later in the year will decide where the next convention shall take place.

Among the interesting talks was one by J. Edward Fuller of Worcester, vice-president and New England manager for the George A. Fuller Construction Company, who spoke of the service rendered by the material men to the contractors.

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There are seven spruces in the United States, of which four are confined to the West, two to the East, while one—white spruce—has a continent-wide distribution.

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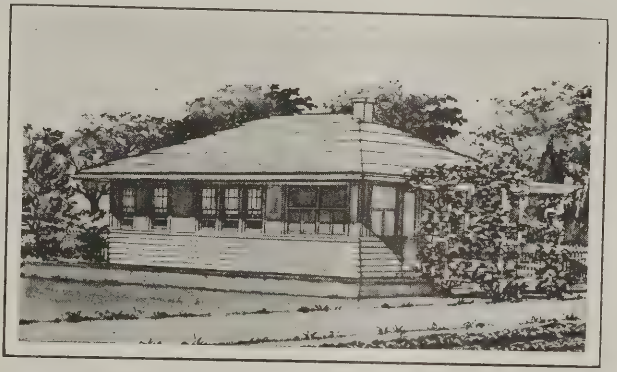
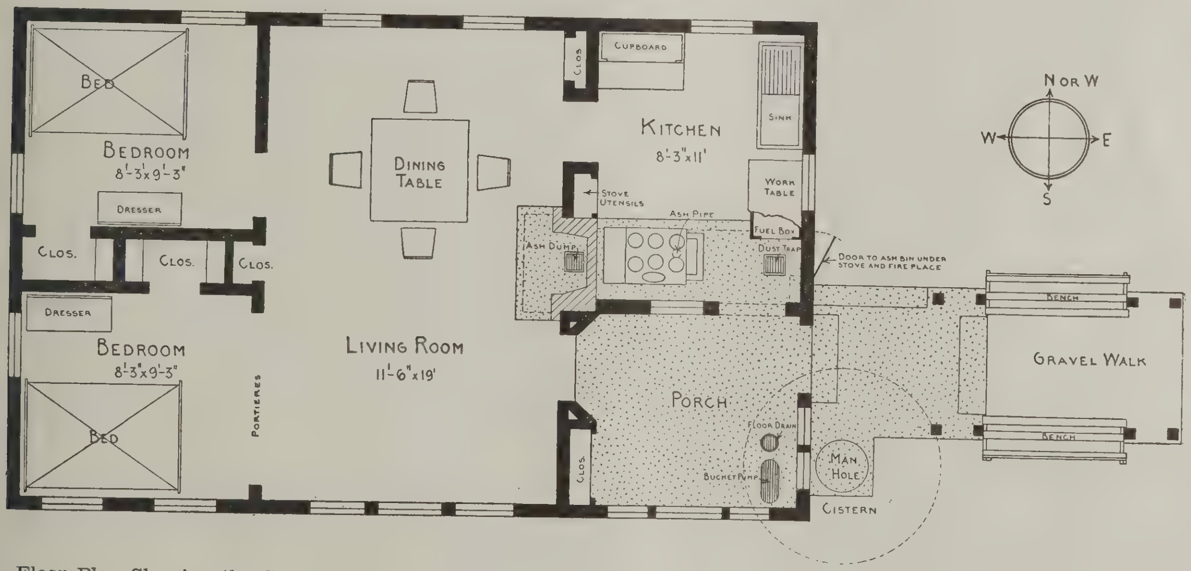
According to a committee of the Association of Commerce, Chicago is the greatest receiving market for lumber in the country, the sales in 1912 being 2,642,650,000 ft., which was an increase of 20 per cent over 1911.

A Well-Arranged Low Cost Farm House

Farm Dwelling Showing the Most Inexpensive Arrangement Consistent with the Needs of a Small Family



Perspective View of the Low Cost Farm House



Floor Plan Showing the General Arrangement of the Rooms as well as Some of the Principal Articles of Furniture

A Well-Arranged Low Cost Farm House

THE belief that the family house is the most important building on the farm and that money judiciously expended in its planning and construction is well invested, is the basis of a movement which has just been inaugurated by the United States Department of Agriculture. The intention is to provide plans which will enable farmers to construct inexpensive and better homes and so arranged as to give the maximum in health, comfort and happiness to the family, as well as added convenience to the housewife in her domestic operations.

The plans just made public are for the construction of an inexpensive farm tenant house, although the structure as planned contains many valuable suggestions for owners with small families. The provision of proper tenant houses on farms is of growing importance to farm management, because of the increasing number of rented farms, the growing demand of tenants for modern houses and the better understanding of the influence of the home upon farm labor and field efficiency.

The tenant house illustrated herewith is a square structure without bay windows, gables, dormers or any projection save the cornice which overhangs and protects the walls and window openings. The house planned is for the smallest dimensions and the most inexpensive arrangement consistent with the needs and the convenience of a small family. It has one chimney and one outside entrance.

An inspection of the plan shows that the entrance is through an enclosed or screened porch having concrete floor and fitted with clothes closet and bucket pump. From the porch one enters the living room measuring 11½ x 19 ft., and extending the entire width of the house. Half of this space is used as a dining room, communicating directly with the kitchen.

The living room is large enough for the longest dining table that harvest days are likely to require, and with its two routes to the kitchen it is unusually convenient for feeding a large number of workmen. With triple windows on the south and two on the north, a screened porch on the east and an alcove bedroom on the west, it is as pleasant a dining and sitting room as a much more expensive house would provide, and with a glowing fire in the hearth it may be as comfortable and as cheerful in winter as a steam heated dwelling.

The kitchen is provided with a cupboard, work table, sink, closet for stove utensils and a commodious range. The latter rests on a concrete floor and abuts against the chimney, on the living and dining room side of which is an open fireplace.

The stove is within 6 ft. of the most distant fixture in the kitchen, and but little farther from the dining room table. The arrangement is such that the ashes drop from the firebox of the stove through a short pipe to the ash bin beneath the concrete floor. This ash bin is under the fireplace, as well as the stove, and extends to the outer foundation wall of the kitchen, where the ashes and floor sweepings are removed by a long-handled drag.

If the building is raised on a front terrace the bin will be 26 in. deep with its floor at the ground level. With a cellar under the kitchen the bin need extend only to the front end of the stove and it will be deep enough to hold a year's supply of ashes.

The fuel box supporting the table top occupies space which might otherwise be wasted. It is filled from the outside of the house and emptied from the inside through a small door over the concrete floor. A trap or dump, like that in the fireplace, is provided for floor sweepings and possible dust from the door of the coal or wood box. It is in the concrete floor behind the kitchen door near the fuel box opening and over the ash bin.

The kitchen has the important advantage of not being a thoroughfare to other rooms. The men and boys can wash on the porch, hang their hats and coats in the closet there provided, and enter the living room without entering the kitchen.

Separated from the living room by a cased opening, intended to be closed by portieres, is an alcove bedroom 8 ft. 3 in. by 9 ft. 3 in. and containing a dresser. From the dining room end is another bedroom of similar dimensions, and out of each bedroom opens a commodious clothes closet. There are also closets opening from the living room and from the dining room.

The enclosed porch may be screened in summer, and besides the usual kitchen work, ironing and perhaps the clothes washing will be done there. The porch will also be in demand as a dining room, sitting room, sleeping porch and play room. The one screen door locks up the house and the butter, meat and milk put on the porch to cool at night will be secure against the cats and dogs.

The water problem has also been carefully considered in connection with this little plan, for cistern water may be drawn from the bucket pump on the porch, or if desired from a pitcher pump at the sink. Hot water is heated and stored in the reservoir of the stove.

According to the Information Bureau of the Department of Agriculture the design of farmhouse here shown should cost anywhere from $800 to $1000, depending on location.

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Building a Village on Stilts

A rather unique problem confronting the contractor having under way the construction of houses to quarter the men engaged in building the gigantic tunnel through the Selkirk range of the Rocky Mountains at Glacier, B. C., was the drifting snow which made it almost impossible to proceed with the work in a satisfactory manner. As a consequence the idea was conceived of building a village on stilts. The floors of the houses are to be 8 ft. above the ground and the streets will have no sidewalks but there will be a walk in the center also 8 ft. above the ground level and connected with the doors of the several houses by little bridges.

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Some Uses of Maple

Maple is to-day, according to the Department of Agriculture, one of the most widely used and valuable native hardwoods. A Bulletin on the uses of maple, just issued by the department, states that the wood finds place in an enormous number of articles in daily use.

It is one of the best woods for flooring, and is always a favorite material for the floors of roller skating rinks and bowling alleys. It leads all other woods as a material for shoe lasts, the demand for which in Massachusetts alone exceeds 13 million board feet annually.

Sugar maple stands near the top of the list of furniture woods in this country. The so-called "bird's-eye" effect, the Department explains, is probably due to buds which for some reason cannot force their way through the bark, but which remain just beneath it year after year. The young wood is disturbed each succeeding season by the presence of the bud and grows around it in fantastic forms which are exposed when the saw cuts through the abnormal growth.

Maple, the Department goes on to say, is one of the chief woods used for agricultural implements and farm machinery, being so employed because of its strength and hardness. All kinds of wooden ware are made of maple, which holds important rank also in the manufacture of shuttles, spools, and bobbins. It competes with black gum for first place in the manufacture of rollers of many kinds, from those employed in house moving to the less massive ones used on lawn-mowers. Athletic goods, school supplies, brush backs, pulleys, type cases, and crutches are a few of the other articles for which maple is in demand.

Seven species of maple grow in the United States, of which sugar maple, sometimes called hard maple, is the most important. The total cut of maple in the United States annually amounts to about 1,150,000,000 feet. Nearly one-half is produced by Michigan, with Wisconsin, Pennsylvania, New York, and West Virginia following in the order named. Sugar maple, says the Department, is in little danger of disappearing from the American forests, for it is a strong, vigorous, aggressive tree, and though not a fast grower is able to hold its own. In Michigan it is not unusual for maple to take possession of land from which pine or hardwoods have been cut clean, and from New England westward through the Lake States and southward to the Ohio and Potomac rivers few other species are oftener seen in woodlots.

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What is known as the Heidelberg Building, at the junction of Broadway, Seventh Avenue and 42d Street, New York City, the tower of which was originally erected for advertising displays, having proven unsatisfactory for the purpose, the property has changed hands, and in its place will rise a skyscraper more than 30 stories in height.

Details of Convenient Writing Desks

Work That the Building Mechanic, Clever with His Tools, Can Profitably Execute in Dull and Other Seasons

By Paul D. Otter

In many homes it is still a momentous task to commence a letter, write a check or sign a receipt, because it involves such a search for the wandering ink bottle and the ever-straying pen. Many parents unmindful of convenience and present-day requirements for themselves, fail to note that their children should be provided with the same means of pursuing their studies as comfortably and even more quietly at home, as at school. It is the sense of ownership, whether it be a chest of tools or a writing desk that inspires amazingly the boy or girl to work into original development.

The student writing desk, illustrated in Fig. 1 of the sketches, is well adapted for a bedroom and in building, it may be so planned as to width, to exactly fit into a certain niche or recess and thus be less in the way. When in use a chair drawn up gives free access to the feet under the front flap which lets down, offering an extended writing surface on the reverse side. The dotted lines indicate the bottom board of the case and the paneled front operates on either a stiff pair of steel T-hinges placed unseen underneath or some form of steel pin and socket can be substituted. Whatever the device used it should be very strong, as the projecting lower edge of the framed front, when horizontal, presses underneath the cabinet. A metal writing desk break-joint support could be secured inside of the cabinet and on to the drop front but in this form of desk it will not be really necessary.

The disposition of simple compartments for paper and envelopes and a small drawer for materials will be one of the pleasures for which to plan in order to take care of individual needs. The disposal of these compartments, hung as it were from the top, would, of course, give much desired room for this condensed form of desk.

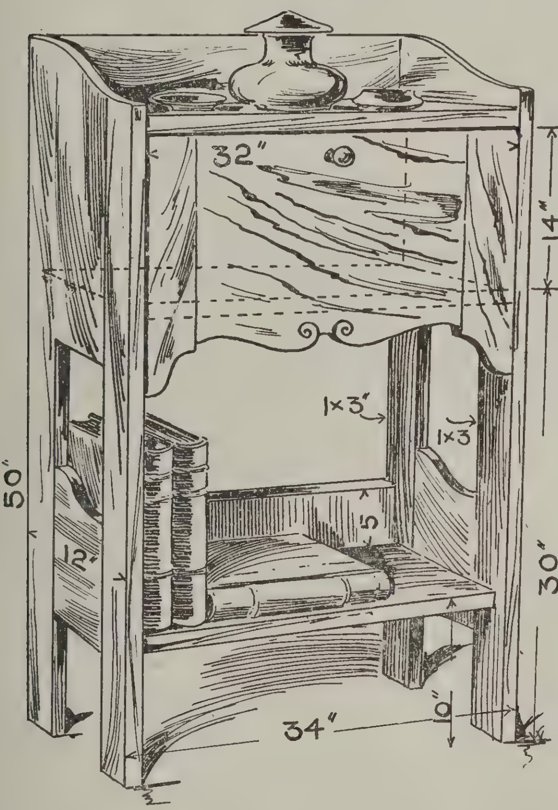

Fig. 1—General View of a Student Writing Desk

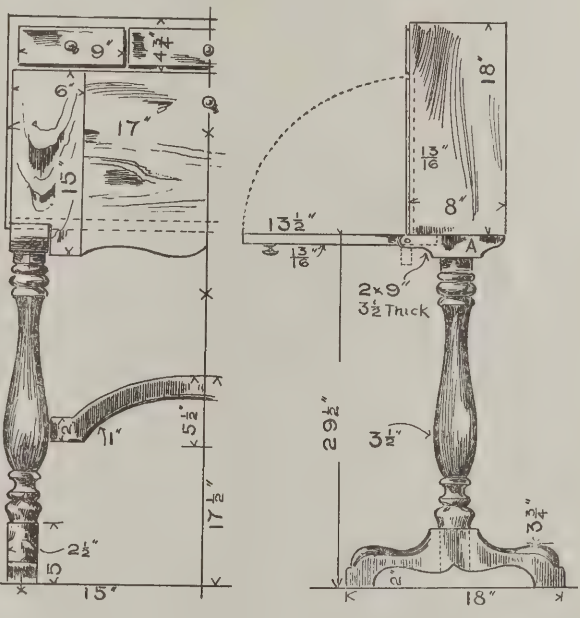

Fig. 2—Another Form of Handy Writing Stand Showing a Half Front View and an End View

Details of Convenient Writing Desks—By Paul D. Otter

Another form of writing stand which in the latter part of the eighteenth century was known as an *escritoire,* or writing stand, is illustrated in Fig. 2. This type and its outline would look best made in birch or mahogany. It will be found very useful in the living room as a repository for writing materials for the convenience of the household.

The mechanism is somewhat similar to that in Fig. 1 and is best shown in the side view Fig. 2, where a steel pin is indicated piercing the extended cap of the stand "A" and entering the edge of the drop front. The edge at this point should be safeguarded from splitting by fitting a metal plate to it.

After the standards have been turned from a 3½-in. square piece, allowing ample length on each end from which a tenon fully one-third the thickness should be cut to pierce the full width of the top support and the center of base, put cross pins through both joints. A smooth roundness can be given to the top of the base and the middle curved strainer rail should also pierce the post a good distance, cross pins being driven in and flushed smooth. A stiffening top rail should connect the top supports "A" and be also screwed against the center of the cabinet. The cabinet or case may be made of 13/16 in. material.

The fortunate possessor of an old-time melodeon or an antique spinet need not at times question the hoarding of such an apparently useless instrument, for it is now a most desirable article of furniture when the inner mechanism has been removed and the space fitted for writing purposes. There still remain in the possession of many families specimens of these early colonial musical instruments which have most beautiful cases and outward form, the material being usually rosewood or mahogany. The one illustrated in Fig. 3 shows the usual type of higher grade rosewood spinet, many of them richly carved over the knee of the cabriole leg and a pie crust molding running along the lower edge of the case.

What makes these most interesting to the modern woman with her large social and club correspondence to look after, are the proportions which give a gratifying amount of elbow room as well as generous drawer and stall room along the back and at each end. Fig. 3 also illustrates the interior space disposed of in this suggestive way and is offered to the favored few who might be in possession of an old instrument or who might secure a commission to rehabilitate one, from some patron of a craftsman's skill along these lines.

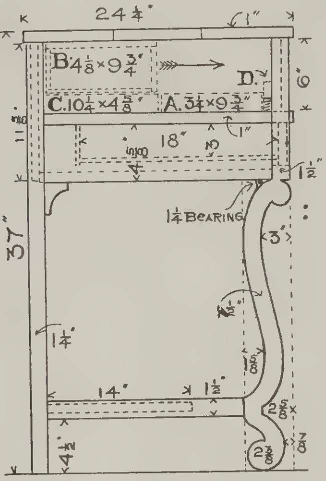

Fig. 5—Side View of a Colonial Spinet Writing Desk

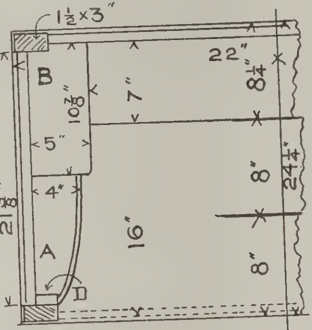

Fig. 6—One-half Plan of Colonial Spinet Writing Desk Taken on a Line Just Above the Writing Bed of the Desk

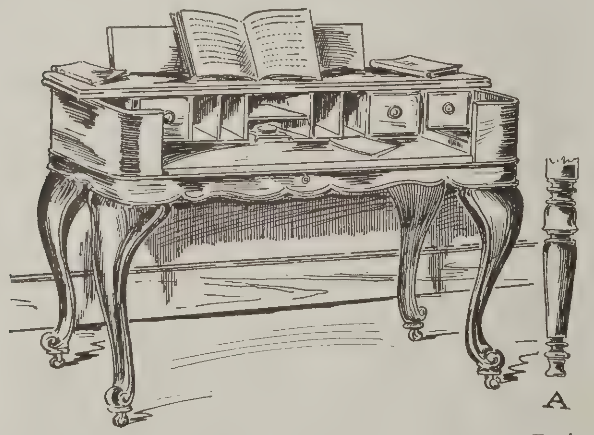

Fig. 3—A Rosewood Spinet Desk with Alternate Leg Design

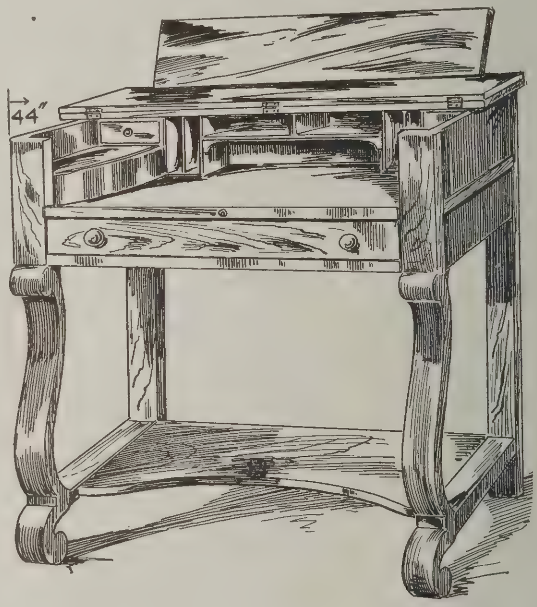

Fig. 4—General View of a Colonial Spinet Writing Desk

Details of Convenient Writing Desks—By Paul D. Otter

The leg shown at "A" is a proper Colonial substitute should one desire to make up a case of this kind in place of the elaborate French leg which is difficult to make without experience in carving.

As a recompense to the unfortunate many who may not possess old spinets that could be made useful again, the construction shown in Fig. 4 is offered as a substitute, this embodying the Colonial or post-Colonial type of front post. This will prove a rare joy in the making and immense satisfaction to the possessor, as it embodies all of the good features of the remodeled antique and will be found most easy to work out by any one who aspires to master good joinery.

The entire case is encompassed within 24¼ x 44 in. x 37 in. in hight. The structural elements will be so readily understood when Figs. 5 and 6 are enlarged to full size drawings in the same manner as shown, that very little need be said as to the measurements. The plan, Fig. 6, simply shows half the length and the figures are merely outside measurements of the various compartments which are given in more detail in the side view, Fig. 5.

One of the appealing features to a practical person of literary pursuits is the large lower drawer under the writing bed which the spinet case does not possess. Another surprise—and who does not like a secret—is the secret compartment. While there are not the same reasons or purposes in having secret doors; drawers and compartments in our homes and in our furniture as in feudal times and in ages before banks and security vaults were known, still there are many occasions when valuable papers are temporarily withdrawn from the safe deposit or vault box or perhaps await opportunity to return to guaranteed safety, when a secret place is a real satisfaction from prying curiosity.

In locating the secret compartment, refer to the half plan in Fig. 6 where "A" is an open tray 1½ in. deep with a drop lid. This holds pen, pencils, etc. Back of "A" at "D" is space for the drawer seen in the detail at "B" in Fig. 5. Under "B" is the secret compartment "C" which cannot be entered except by completely taking out the drawer "B" over the top of "A." It then cannot be withdrawn until the small block "D" is removed, pressed down or pushed to one side by some secret means. To all intents and purposes it is a small finishing block back of the front pilaster.

Details of the Secret Compartment

Having by the known means pressed or removed the block the drawer "B" is permitted to come full length and be lifted away disclosing the space marked "C" which is sufficient to hold legal or business size envelopes. The block "D" is ⅝ in. thick, 1⅜ in. wide and 2⅛ in. long and is held up in an unsuspected manner by two stiff coil springs or any other device may be adopted for removing it by some pulling and pushing movement by groove and pin.

If only one secret drawer is desired a similar block shrould be glued fast in the same position on the other side to avoid suspicion of a hidden compartment and also to give balance to the plan.

The space in the middle rear of the writing bed may be subdivided to suit personal needs or as suggested in the picture, Fig. 4. Well selected ⅜ and ¼ in. stock should be used for such purposes. The curved side of the front compartment "A," Figs. 5 and 6, should be sawed from a heavy piece with an easy sweeping curve. Great care should be given in selecting stock for the writing bed so that it be dry and perfectly jointed and glued.

Under the writing bed is a very ample drawer spaced between the front posts and extending to a length of 18 in. or more if desired. It should have a depth of 3 in. Sunken dull brass handles would probably be more in keeping than the projecting wooden pulls often used on drawers.

The under shelf has a width of 14 in. at the side strainer rails and is reduced by a curve to 9 in. at the center. A good deep tenon should secure the ends to the rails which are 1½ x 2¾ in. wide. The front and back posts are 3 in. wide. The front post, as indicated by the dotted lines in Fig. 5, is confined to a width of 4 in.

Some Features of Construction

The measures given of several low places will enable the craftsman to lay out the shape gracefully. It will be noticed that above the top scroll the post continues in a plain pilaster which forms the front corner of the case. Back of the scroll leave a 1¼ in. bearing to strengthen and support the side rail. The scroll portion may afterward be more defined by cutting with a gouge. The dotted line along the lower part of the side rail indicates a front and back strengthening rail which may have further connection with the backboard and rail under the drawer by means of neatly cut corner glue blocks and screws well set into place. The back board is one full board 11⅝ in. tenoned into the back posts.

The top is three-fold; the back board 8¼ in. wide, being securely fastened to the top of the carcase. This may be done without glueing to the edges by using screws well sunk in the top and the holes very carefully matched by wood plugs flushed off. The two front top panels are both 8 in. wide. The middle panel hinging back on to the fixed panel when open and the front top panel are connected with the middle by three butts put on in reverse position, the hinges of which hang down inside 5/16 in. so that when the ⅝ in. front flap folds back the three panels may either lay back flat on the top panel when the desk is open or they can be rested on edge vertically.

Three hinges to each joint should be used and as they show prominently should be of good quality polished or dull brass. A lock of the character used on a piano should be utilized to secure the top and the drawer should be provided with a good grade of drawer lock.

Of the three popular woods—mahogany, walnut and oak—mahogany is the one recommended for this Colonial design.

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New Type Building at Manila

A six-story concrete building, the most modern and complete in Manila, is to be erected by My Chaco Sons, says the *Manila Times*. Fifty-six offices are to occupy the four upper stories, while the hardware business of the company will occupy the first two floors. Under authority of the governor-general a new type of floor, or foundation construction, is to be used in the skyscraper, a type designed by Albert F. Fields, inspector of building construction for the city. This is called the raft and floor foundation combined, and has the advantage of requiring only to be surfaced with tile, when the entire first floor, including sidewalks and arcade floors, is complete.

The ordinary type necessitates steel reinforcement being used beneath the mass of the floor, after which another fill is required, and on top of that the floor, either of wood or tile. A new system of day-lighting the offices of the building from the corridors is to be used. In this a concrete wall 5 ft. high separates the office from the corridor, then comes a 6-ft. stretch of ground glass, after which steel wire netting reaches to the ceiling.

On the first two floors a certain amount of hardwood is to be used as a finish, giving a "Mission" effect. Except from the doors and window frames on the floors above only steel and concrete will be in evidence. The sixth story is set back 6½ ft. from the face of the building, which permits a walk around the entire building, making the offices on that floor most desirable. A clock tower surmounts the Rosario corner of the structure, with an enormous electric clock.

The building will be of the arcade type, great plate-glass show windows opening upon the sidewalk. In these windows will be shown the hardware stock, in which the firm deals exclusively. The entrance to the office buildings is from the Plaza Cerventes side, a great lobby, which is to be unobstructed by stands or booths, and is faced by battery of electric elevators of most modern type.

Suburban Cottage of Stone Construction

Example of the Bungalow-Type of Cottage in Which Rubble Stones Are Used for the Outside Walls

THE subject of our colored supplemental plate this month is a suburban cottage of stone construction with half timber and stucco treatment of the gables and a roof covered with red cedar shingles laid 5½ in. to the weather. The cellar extends under the entire house to a depth of 4 ft. 8 in. below grade. The footings for the exterior walls are of concrete 12 in. thick and 32 in. wide. The exterior walls are 20 in. thick constructed of rubble or cobblestone carefully laid up in as artistic a manner as possible. The gables are of half timber and stucco, as shown in the perspectives presented herewith, the stucco work consisting of two coats applied on metal lath. The frame at this point is covered with 1 x 10 in. North Carolina pine sheathing laid diagonally and covered with two-ply building paper. The scratch coat is ½ in. thick, consisting of one part Portland cement, three parts sand and not more than 10 per cent. lime putty. The finish coat is ¼ in. thick, consisting of one part cement, two parts sharp white sand and three parts of pebbles for rough finish. The roof shingles are dipped in Cabot's shingle stain.

The Framing Members

The framing timbers consist of girders 6 x 8 in. supported on concrete piers; sills and posts 4 x 6 in. in size; plates 2 x 4 in. doubled; ties 4 x 6 in.; first floor beams 3 x 8 in. placed 16 in. on centers; second floor beams 2 x 8 in.; rafters 2 x 6 in.; porch floor and roof beams 2 x 6 in. and studs 2 x 4 in., all placed 16 in. on centers. The floor beams are stiffened by two rows of 1 x 2 in. cross bridging double nailed.

The cellar has a concrete floor consisting of a 2:3:5 mixture laid 3 in. thick on cinders. The concrete work is finished with a 1 in. coating of cement mixed in the proportions of one part cement to two parts sand. The porch floor and front steps are of concrete having a similar finish.

The Floors

The floors of the principal rooms are doubled, the sub-floor consisting of 1 x 10 in. North Carolina pine on which is laid two-ply building paper, this in turn being covered with a finish floor of 2 x ⅞ in. North Carolina pine tongued and grooved flooring. This is finished with two coats of wax. The rooms of the second story or attic have 2½ x ⅞ in. North Carolina pine flooring.

All walls and ceilings are lathed and are plastered with two coats of King's Windsor cement, the finishing coat being hard finish, except in the lower hall, living and dining rooms. All walls are tinted with Alabastine in selected colors.

The feature of the living room is the large open fireplace and mantel constructed of cobblestones. The hearth is of concrete 20 in. wide and laid with 6 x 6 in. dark red tile.

The Trim

The trim of the first floor stairs, hall, living room and dining room is of chestnut; that of the kitchen, pantry and all bedrooms is of cypress. The inside doors are 1½ in. thick., those on the main floor being of chestnut where they face on the hall, the dining room or the living room.

The stairs are built with 1½ in. strings, ⅞ in. risers and 1¼ in. oak treads.

All window frames are of white pine with 1 in. pulley stiles. The windows opening on the porch are of French casement type. The sash is glazed with double thick American glass.

All 1½ in. doors have 4 in. bronze face locks and 4 x 4 in. bronze loose pin ball tipped butts. Double action doors are hung with Bommer Bros. bronze double action hinges.

The Plumbing

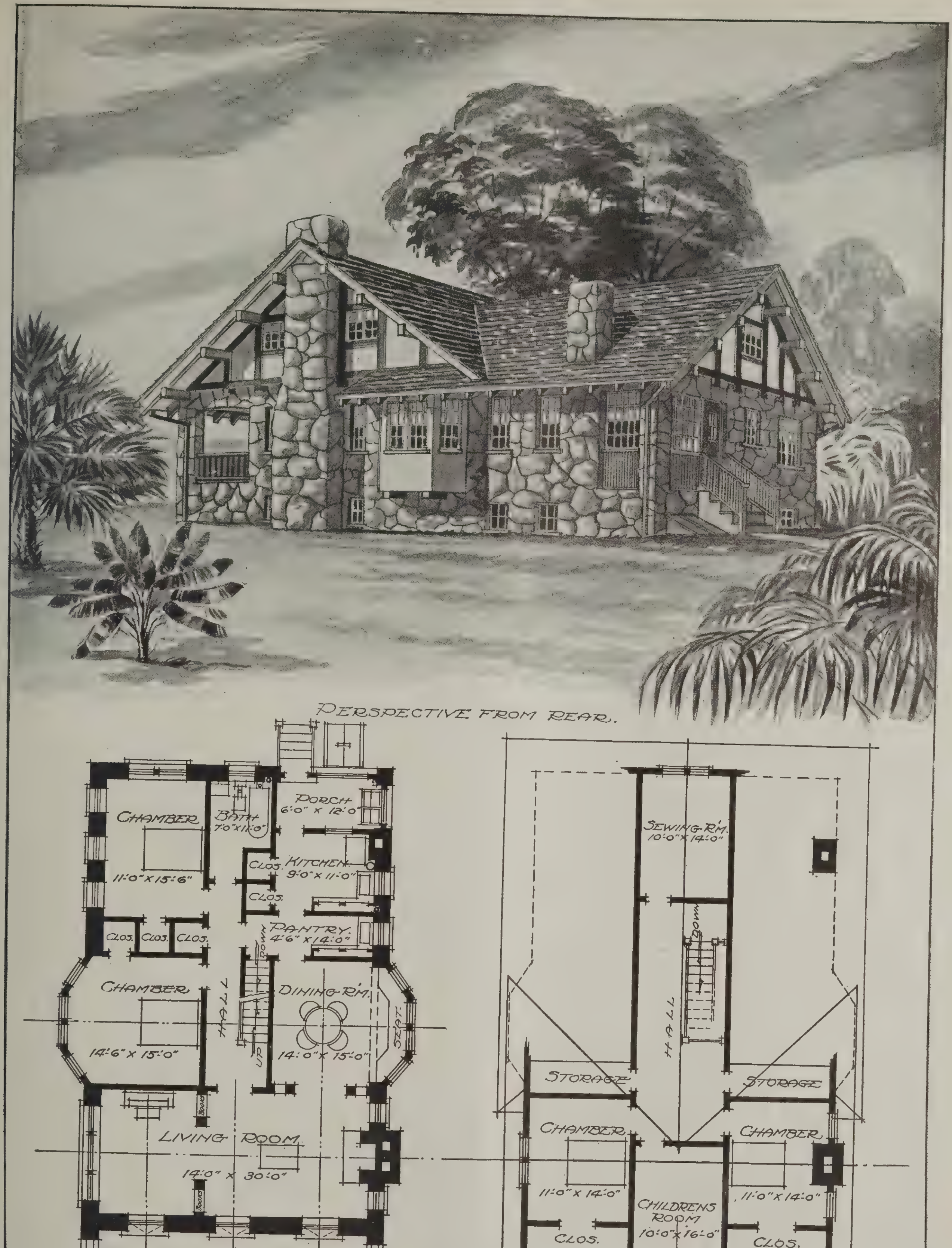
The floor plans upon the facing page clearly show the arrangement of rooms, while the miscellaneous details indicate some of the features of construction. The plumbing system is also portrayed upon a page by itself. The plumbing throughout the house is of standard make, all exposed pipes being nickel plated. The bath room has a floor of mosaic tile and the side walls are tiled for a distance of 3 ft. from the floor with 3 x 6 in. white tile. An 8 in. sanitary base is carried around the room. The fixtures consist of a front outlet wash-down closet with 10 gallon copper lined tank and with white enamel finish for both tank and seat. The bath room also has a 5 ft. roll rim porcelain enameled tub and an iron enameled wash basin supplied with hot and cold water through ½ in. galvanized iron pipes.

The kitchen and pantry have iron enameled sinks supplied with hot and cold water through ½ in. nickel plated brass pipe and ⅝ in. flange and thimble compression cocks. The kitchen also has a 40 gallon galvanized iron boiler. A combination coal and gas range is placed as shown on the floor plan.

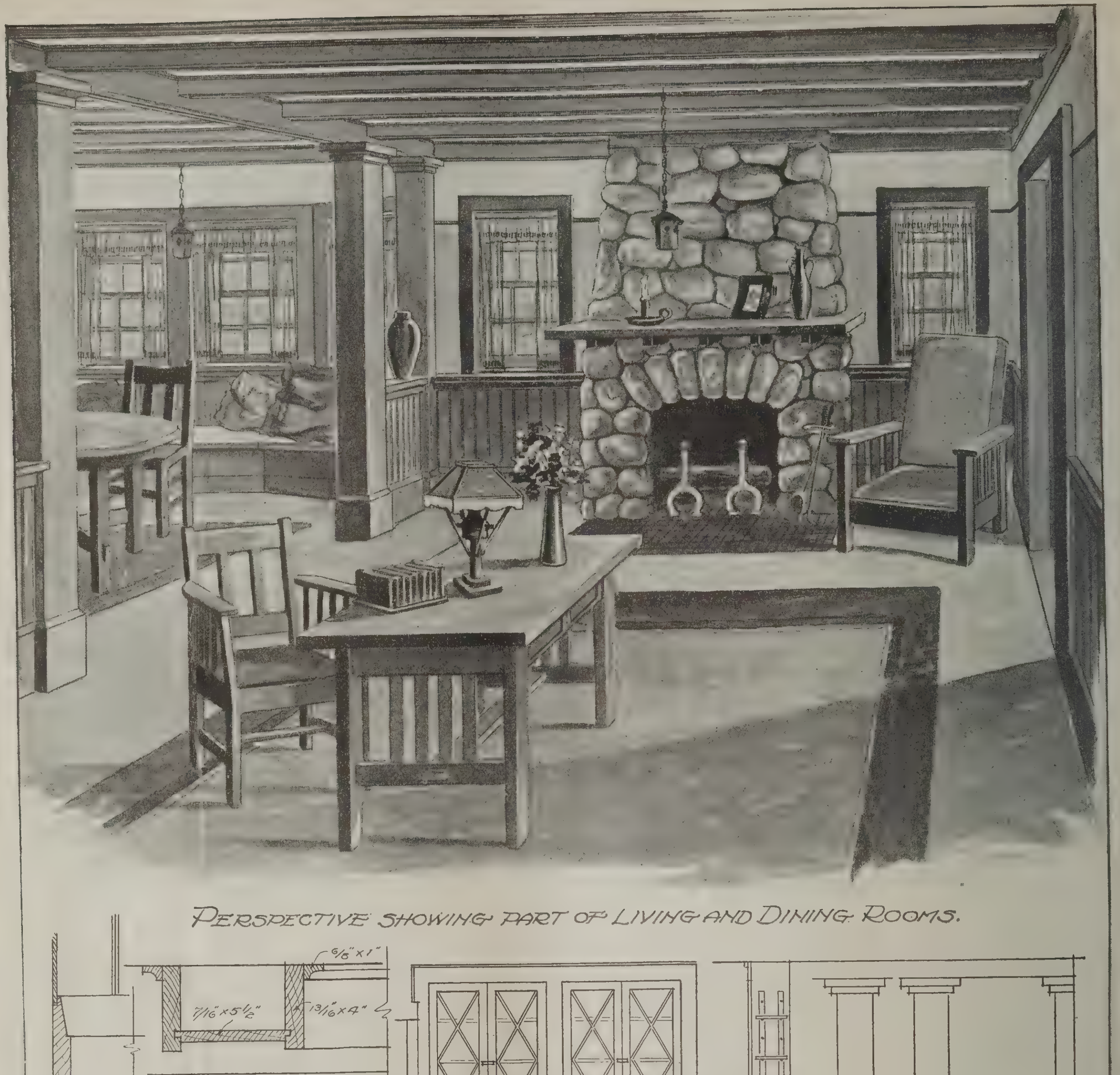
On the enclosed porch is a set of two brown earthenware wash trays with galvanized iron covers and frames and supplied with hot and cold water through ½ in. galvanized iron pipe. The waste is 2 in. lead pipe all properly trapped and ventilated.

The house is heated by hot air furnace and the lighting is by gas and electricity, combination fixtures being installed in all the rooms.

All the interior woodwork is finished with three

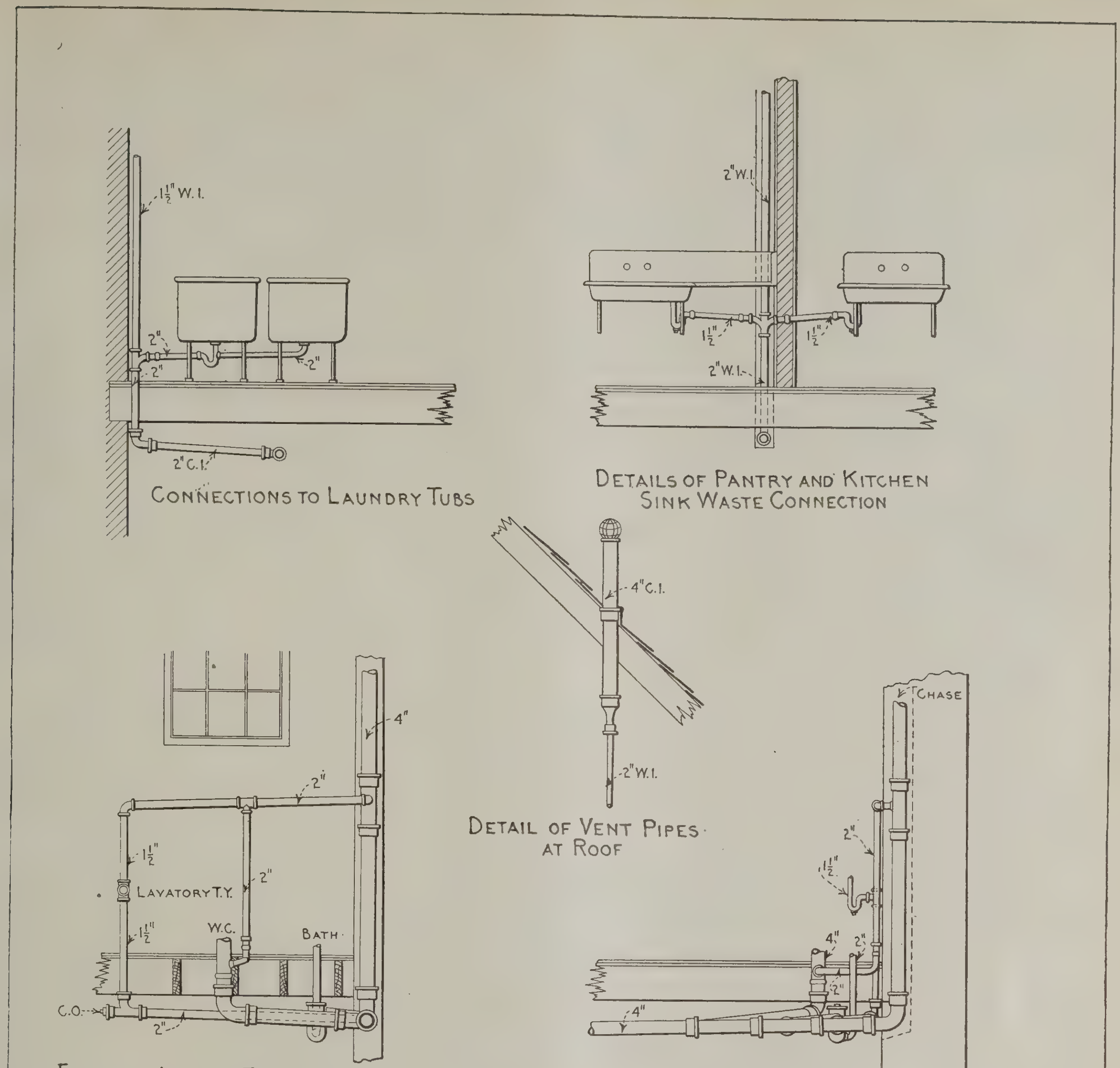


Exterior View and Floor Plans of Suburban Cottage of Stone Construction Forming the Basis of Our Colored Supplemental Plate this Month



Interior View and Miscellaneous Details of Suburban Cottage of Stone Construction Forming the Basis of Our Colored Supplemental Plate this Month

BUILDING AGE
NEW YORK



Details of Plumbing System in Suburban Cottage of Stone Construction Which Forms the Basis of Our Colored Supplemental Plate this Month coats of Pratt & Lambert's preservative, the dining room, lower hall and living room being done in silver gray Mission, while the entire upper floor is done in cream white. The doors are mahogany stained, varnished and rubbed down.

All outside woodwork is painted with three coats of white lead and linseed oil. The ceiling of the porch has three coats of Spar varnish, also the under portions of the projecting roof.

Estimated Cost of Labor and Materials

The approximate cost of labor and materials, taking the size of house as 34 x 64 ft., including porches, and the approximate height 23 ft., and figuring at 20 cents per cubic foot is $10,009.60. Some of the more important items are:

Excavating and grading	$200
Masonry work, including footings, foundation walls, chimney and fireplace	2,700
Concrete flooring	360
Plastering exterior and interior	740
Carpentry labor	1,200
Lumber bill	1,350
Mill work and glass	1,100
Painting, staining and tinting	450
Hardware	200
Metal work	250
Heating	350
Plumbing and gas fitting	400
Electric wiring	120
Combination lighting fixtures	100
	$9,520

The above figures include the contractor's 10 per cent. profit.

For a shingle house with concrete foundation and based on the same floor plans, figuring the price at 15 cents per cubic foot, the approximate cost of labor and materials would be $7,507.20. This includes the contractor's 10 per cent. profit.

The house here shown was designed by Arthur Weindorf, architect, Long Island City, N. Y.

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Building Activities in Chicago

The valuation of permits for the months of January and February of this year fall behind to the extent of $2,000,000 when compared with the same months in 1913. In spite of this, however, the opening of the building season will see a marked activity in the business and outlying districts, especially in hotel and office building construction.

The permits for February, 1914, numbered 376, having a frontage of 14,720 ft., and an estimated cost of $5,070,600. The same month last year produced 495 permits, with 16,222 ft. frontage, at an estimated cost of $4,668,600.

Of the more important undertakings in the business district the work on the new Morrison Hotel is noticeable. This structure will be built in three sections, considerable progress having already been made on the first section. Near by will be erected the new sixteen-story Lumbermen's Exchange.

At the southwest corner of Randolph Street and Fifth Avenue a twelve-story hotel building will be erected, to cost about $500,000. Alfred S. Alschuler is preparing plans for a brick and steel building with terra cotta trimmings and ornamental grills. The contemplated building of Chicago's new Union depot near this site is probably a large factor in the building of this hotel. Announcement is also made regarding the erection of a fourteen-story steel fireproof building at the southwest corner of West Madison and South Canal Streets, opposite the new Northwestern Depot. The cost will be about $500,000. The finishing touches are being made on the 21-story Continental and Commercial National Bank Building, and occupancy will be about May 1.

In the outlying districts building construction is being undertaken at a normal rate, and several important additions have been made in the way of small office buildings, theatres and stores. Generally speaking, there is every indication for a good opening of building activities on April 1.

◆

Prize Winners at Exhibition of Architectural League of New York

The twenty-ninth annual exhibition of the Architectural League of New York was held according to program and attracted a large audience. The various exhibits were the center of deep interest on the part of those architecturally inclined and the displays were notable in many respects.

The Collaborative Prize of $300 for a museum doorway in Faience was won by Aymar Embury, architect; Arthur Crisp, painter, and Salvator Bilotti, Sculptor. The medal of the Architectural League for painting went to Barry Faulkner for a carefully executed panel entitled "Famous Women." The Sculptor medal went to Karl Bitter for his exhibit and the medal of the New York Chapter of the American Institute of Architects went to York and Sayer for their design of the Guaranty Trust Company building. The Avery prize for sculpture was won by F. Telles Chamberlin.

◆

National Warm-Air Heating and Ventilating Association

For the purpose of promoting the interests of the warm-air furnace industry heating manufacturers from all sections of the country where furnaces are made gathered in Cleveland, Ohio, recently and effected an organization to be known as the National Warm Air Heating and Ventilating Association with officers for the ensuing year as follows:

President.......John D. Green of the Detroit Stove Works, Detroit, Mich.

Vice-President..F. T. Giblin of Giblin & Co., Utica, N. Y.

Secretary.......Allen W. Williams, of Columbus, Ohio.

Treasurer......W. G. Wise of the Wise Furnace Co., Akron, Ohio.

The executive committee consists of E. P. Miller of the Lennox Furnace Company, Marshalltown, Iowa; John D. Howard of the P. D. Beckwith Estate, Dowagiac, Mich., and F. C. Seelbach of the Forest City Foundry & Mfg. Company, Cleveland, Ohio.

It may not be without interest to state that the Association was effected through the efforts of John H. Hussie, chairman of the Furnace Committee of the National Association of Sheet Metal Contractors, who issued the formal call and who acted as chairman of the meeting.

Novel Construction of Concrete Tank

A Reinforced Concrete Water Tank of 750,000 Gallons Capacity Built with a Sliding Joint at the Base

WITHOUT doubt one of the most interesting pieces of reinforced concrete work in the shape of a water tank is that which has just been completed on the plateau at the top of Nob Hill, San Francisco, and which is commonly designated as the Jones Street Tank, because it is in the block bounded by Jones, Leavenworth, Sacramento and Clay Streets. The tank is 60 ft. in diameter, 35 ft. 10 in. in hight and has a capacity of 750,000 gallons. The novel feature of its construction is the sliding joint between the side and bottom of the tank, the purpose of which is to avoid if possible the cracks which have appeared in the past near the base of the side walls in many reinforced concrete tanks of large size.

In the half-tone engraving upon this page we show the general appearance of the completed tank and its architectural treatment. It is the same as that used in connection with all the municipal engineering buildings in the city named, being a free handling of the Mission style. It will be noted from an examination of the picture that the lines of the tank are rather pleasing for a construction of this character. It has a simple molded base; a conical-shaped roof with no interior support, and a rather severe cornice. The latter, however, is lightened by a series of 12 luster-tile inserts, there being one between each pair of triglyphs which mark the corners of the pyramidal roof. The latter is covered with terra cotta tile of a reddish tinge and is topped with a lantern ventilator, the roof of which is covered with similar tile. The tank has a white cement finish which it is interesting to note was applied by means of a cement gun.

This reinforced concrete tank is intended for auxiliary fire service and is in reality the last important unit of the high pressure water supply system in the city. The tank stands at an elevation of 334¼ ft. above the sea level.

General View of Concrete Water Tank Having the Unusual Sliding Joint at the Base

The construction of the sliding base joint is indicated in the detail presented on the following page which represents a section through the wall and there is also given a vertical section of half of the tank showing the reinforced concrete construction of roof, side walls and bottom of tank. The concrete in the base was first poured and the surface directly under the wall was made as level and smooth as possible with a cement finish. Next a coating of Asphaltic paint was applied for the purpose of preventing adhesion of the concrete in the walls to the concrete in the base. The forms for the walls were then built, the steel rods for reinforcing purposes were placed in position and the concrete poured continuously to the construction joint at the top, after which the roof was built and the concrete poured for it. After the forms had been removed from the inside of the tank the joint at the base was thoroughly cleaned out by means of a compressed-air blast; oakum was tightly calked into place and the joint then filled with liquid asphalt.

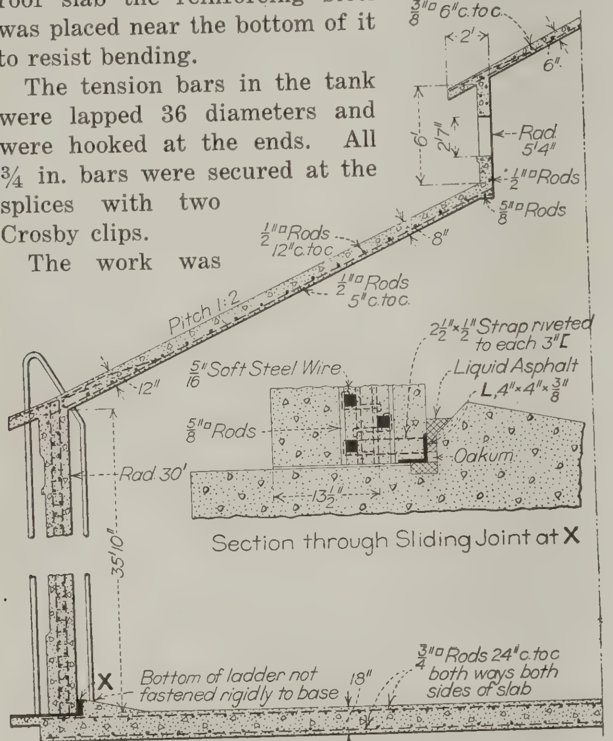
The raised rim inside the joint is intended to prevent any great movement in case of earthquake. The circumferential steel angle was used to facilitate construction but it was also further utilized for holding in place the lower ends of the 3 in. vertical channels. A 3 x ⅜ x 6 in. plate was used under each channel to prevent crushing. The channels it may be stated were placed about 10 ft. apart and resulted in perfect spacing of the tension bars. The asphalt under the oakum was in place before the pouring of the side walls, but the remainder was poured after completion. The tank was made water tight by a finish of ½ in.

of cement in the interior applied by a cement gun.

It will be seen from an inspection of the sectional view through the tank that in the bottom which is 18 in thick, ¾ in. square rods placed 24 in. on centers were used for reinforcing purposes while in the side walls ⅝ in. rods were used and in the roof which tapered from 12 in. in thickness near the side walls to 8 in. near the lantern ventilator ½-in. rods were used placed 12 in. on centers. In the roof of the ventilator which is 6 in. thick ⅜-in. square rods were used placed 6 in. on centers. It is interesting to note that in the design of the roof slab the reinforcing steel was placed near the bottom of it to resist bending.

The tension bars in the tank were lapped 36 diameters and were hooked at the ends. All ¾ in. bars were secured at the splices with two Crosby clips.

The work was designed and constructed under the direction of the city engineer and T. W. Ransom was consulting mechanical engineer for the Auxiliary Water Supply System for Fire Protection.



Novel Construction of Concrete Tank—Vertical Cross Section of Half of the Tank, Also an Enlarged Detail of the Sliding Base Joint

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Officers New York House Painters' Association

At the twenty-ninth annual meeting of the Master House Painters' and Decorators' Association of New York State, held in the Board of Governors' room of the Building Trades Employers' Association, in the Builders' Exchange Building, West 33rd Street, New York City, the following officers were elected for the ensuing year:

President....E. M. Bien of Elmira.
Vice-Pres....Daniel Sabine of Utica.
Sec.-Treas...Carl Goeddertz of Rochester.

It was decided to hold the next convention of the association in the city of Elmira.

◆

At the recent convention of the Bricklayers, Masons and Plasterers International Union of America held in Houston, Tex., a resolution was adopted providing for the establishment of an industrial school to teach bricklaying.

Convention of Builders' Supply Association

The fifteenth annual convention of the National Builders' Supply Association was held at the La Salle Hotel, Chicago, Ill., February 17 and 18. A gathering that tested the capacity of the east room was conspicuous at all sessions and a most successful and interesting meeting was conducted. Acting President Charles Warner officiated as presiding officer in the place of the late president, Edward S. Walton.

In his opening remarks Mr. Warner spoke of the material progress made during the past year to establish the policy of co-operation between the various state and district organizations of dealers in builders' supplies. At the afternoon session Mr. Warner introduced Edward K. Cormack of the Wisconsin Lime and Cement Co., who spoke at length on co-operation and trade association principles. Lawrence Hitchcock, general sales manager of the Kelley Island Lime and Transport Co., Cleveland, Ohio, delivered an address on "Hydrated Lime Versus Gypsum for Plastering."

At the morning session of the second day E. K. Cormack of the Wisconsin Lime and Cement Co., Chicago, Ill., was unanimously elected president of the association; J. J. Voelkel of the J. J. Clarke Co., New Orleans, La., was chosen treasurer, while nine well-known members were recommended for positions on the Board of Directors.

At the afternoon session the following papers were read: "Coal and Ice Departments in Connection with the Builders' Supply Business," by George A. Olson; "Interstate Commerce Commission," by A. W. Dowler; "Sales Promotion and Organization Work," by Herbert N. Casson of New York; "Dealers Profits," by Edward M. Hagar, president of the Universal Portland Cement Co., and "Concrete Roads as a Help to Dealers," by Lewis R. Ferguson, engineer for the Association of American Portland Cement Manufacturers. The meeting then adjourned. A banquet was given in the evening, the *menu* being the perfection of culinary art. During the evening an elaborate program of entertainment was given by the glee club of the Chicago Association of Commerce.

An impressive feature of the program was the portrayal of the chair of Fame—a tribute to the memory of the late President Walton. At a signal there was a fanfare of trumpets, and the curtains back of the improvised stage were slowly drawn apart. There was then presented, standing on a chair in the center of the stage, a life-sized portrait of Mr. Walton. The portrait was draped in black and at the foot of the chair, lying on the floor, was a broken column. At this moment a bell distinctly tolled twelve times, during which all present stood up as a token of respect and as a silent toast to the departed president.

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A manual training school is included in the plans for a group of four, two and three-story buildings comprising a high school to be erected at Vine street and St. Johns avenue, Highland Park, Ill., for the Deerfield-Shields high school district. The buildings will also include a class room building, gymnasium, auditorium and power house, the estimated cost being $250,000.

Hoisting Rigs for the Builders' Use—VII.

The "Tripod" Hoist and Suggestions for Constructing It—Various Other Forms of Hoisting Device

By Edward H. Crussell[*]

THE tripod or shear legs shown in Fig. 41 is an old and very well-known hoisting device consisting as it does of three sticks or legs fastened together at the top and from which point the tackle is suspended. Different methods of fastening the legs together are used, that shown in Fig. 41 being, perhaps, the most simple. A hole for a good stout bolt is bored through all three legs; a U-shaped piece of iron called a shackle is placed in position as shown in the drawing and the bolt is run through to hold all together. The bolt should be left rather loose and after it is in place the threaded end should be riveted slightly to avoid the possibility of the nut coming off.

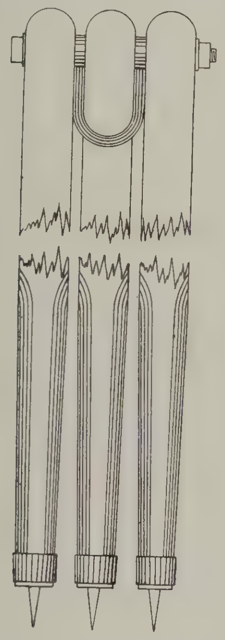

Fig. 41. — The Tripod Hoist, Useful for Work on Rough Ground

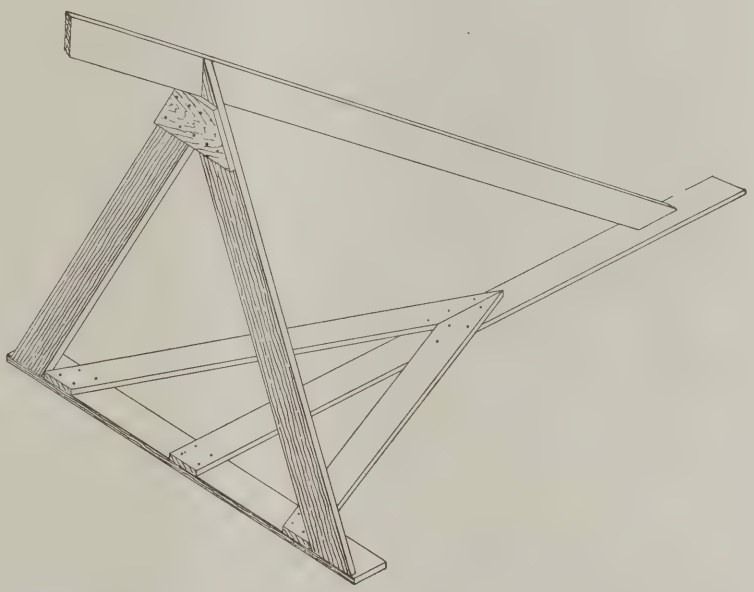

Fig. 42.—A Portable Rig Which the Builder Will Find Useful in Connection with the Execution of Many Different Kinds of Work

Hoisting Rigs for the Builders' Use—VII.—Two Styles of Apparatus

For heavy and constant work the upper ends of the legs should be reinforced with steel plates. The latter should be bent to fit over the tops of the legs and must extend down the sides far enough to take the bolt that holds the shackle. In a temporary rig the shackle is often omitted and the tackle suspended from a rope or chain sling.

Sometimes in emergencies round poles are used for the tripod and instead of a bolt the sticks are fastened together with a rope lashing.

The tripod is often used for such work as laying heavy water pipes in trenches and on account of having only three points of contact is perhaps the best form of portable rig for rough ground.

In erecting a tripod of the larger size it should be laid out on the ground in the form of a "Y," the center leg forming the tail of the letter and the feet of the other two legs as near as possible to the position they will occupy when the tripod is erect. These two legs should be held in place either by tying them to stakes or butting them against something and then after the center has been lifted and set on a short plank or post, all hands take hold of the center leg and raise the tripod into position. It will sometimes be necessary to hitch a snub line to this center leg, especially in those cases where on account of sloping ground or for some other cause the men are not able to raise the apparatus with one lift.

The tripod is taken down in the same manner as it is erected and for this the snub line on the center leg should always be used as it makes the work easier and lessens the chance for accidents.

Years ago when the writer first began to earn his living with saw and hammer, if the boss said to one of the men, "Bill, fix up something with which to hoist the balance of those floor joists," everybody on the job knew the sort of rig that would be erected. Bill, or Tom, or Dick, for that matter, seemed to know of only one rig that could be used.

They would first set up a piece of plank 4 or 5 ft. long for a post; on this they would place a floor joist with one end projecting over the wall and the other fastened to the floor inside the building. Two short braces were then attached to hold this piece steady sideways and then with the tackle fixed on the outer end we were ready to hoist. If some of the floor joists were already in place the favorite way of fastening the inner end of this rig was to put it over one floor joist and down under the next, in which case the post was put in last and cut the correct length to suit.

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[*] Copyright 1914 by Edward H. Crussell.

The contrivance shown in Fig. 42 was evolved from that which I have tried to describe in the foregoing. It has one advantage over Bill's rig and that is it can be easily moved from place to place. After it has been set in position instead of nailing it down, some heavy article such as a plank or a sack of gravel is placed on its tail end and as the tail end is about eight times as far from the fulcrum point as is the tackle the one sack of ballast will hold down at least the weight of eight sacks on the hoist.

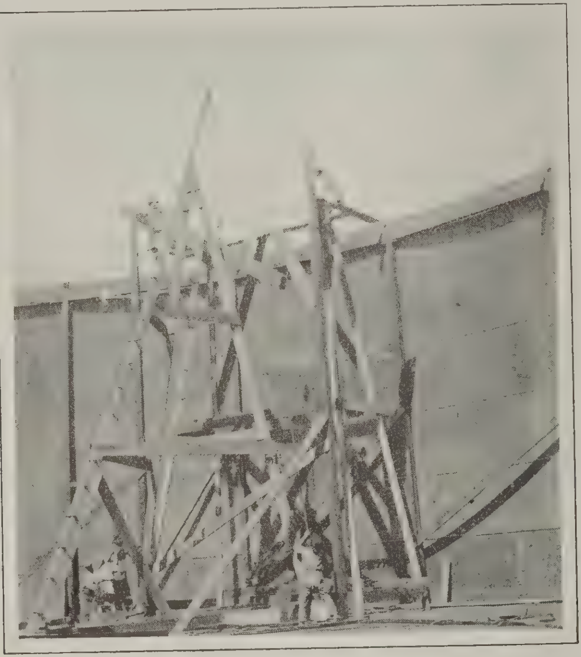


Fig. 43.—The Same Style of Hoist as that Shown in Fig. 42 but Constructed 40 Ft. High

The first rig of this kind the writer constructed was small enough for one man to carry from place to place. It and a number of others were designed to sit on top of a flat roof and were used for hoisting the concrete of the parapet wall. Since that time, however, he has used this same contrivance for a large variety of work and has made it 20, 30 and even 40 ft. high, according as the nature of the work demanded.

The proportion of the hight to the base does not remain the same in the larger sizes, the hight being much the greater. The 40-ft. rig, as near as can be remembered at this time, had a base formed of a 16-ft. plank. It was used on the interior of a 65,000-bbl. oil tank for raising the posts and purlins of the roof. Fig. 43, which is a reproduction from an old photograph, shows this work in progress. With a couple of small rollers it was easy to move this rig around on the tank bottom and one of the purlins—a piece 6 x 14 in. in cross section and 14 ft. in length—on the outer end of the base made plenty of ballast.

Of course in the larger sizes the apparatus has considerable weight in itself and as a general thing no ballast is needed.

The hoist in the photograph has rather an uncouth appearance because of its being made of odds and ends. The main point is, however, that it did the work required and will be found a useful rig for almost any sort of work that can be hoisted with a hand tackle, especially where the hoist must be moved every few minutes or where there is no convenient way of using guy lines.

By keeping our eyes open as we go about our daily affairs we are often able to pick up new ideas. Most of the readers are without doubt acquainted with the arrangement of rope and stick known as a "twister"; if not by that name, then by some other. It consists of a rope or chain passed around two objects that are to be drawn closer together, as for instance, two gate posts or two members of a piece of heavy framing. After the rope has been passed around and the ends tied, a stout stick is thrust between the two parts and by means of it the rope is twisted up until the pieces are brought into position. Teamsters hauling lumber often use a modification of the "twister" for tightening the ropes that hold their loads.

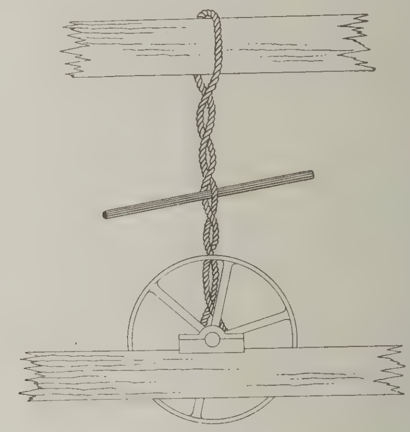


Fig. 44.—A "Twister" Lifting a Line Shaft

The writer had used this idea himself many times in different ways and yet was somewhat startled when he saw a millwright lift a heavy line shaft out of its boxes by means of it. Fig. 44 gives an idea of the millwright's arrangement. The beam over the shaft to which the rope was secured formed part of the roof framing of the mill and though a set of chain blocks would have been handier for this work, in the absence of them the "twister" was made to answer. It should be pointed out that this is a very unfair way to treat a rope, and great care should be taken to use one that is strong enough. It is quite possible under certain conditions for one man to break a new inch rope using it in this manner—something that a dozen men could not do with ordinary usage. Be sure the rope has a big factor of safety and if at all in doubt double or even quadruple it.

(To be continued)

Hoisting Rigs for the Builders' Use—VII.

Suggestions for the Suburban Home

Houses Combining a Variety of Materials—Exterior Color Schemes—Selection and Treatment of the Woodwork

A PRETTY suburban home that will fit into almost any landscape in coloring is a combination of brick and shingles with a shingle or tile roof, tile being preferable owing to its fire-resisting qualities. A pretty variation in a house of this kind is a use of a tapestry brick over doors and windows. Weathered shingles for the second story are in some cases an attractive combination, especially where the house is near the seashore. Stained shingles of a dull green make a neat upper story combination with the brick and tile roof and they can be carried into the construction of the porch with excellent effect.

Another attractive combination is the first story of concrete or stucco with an upper story of shingles, says Clara Brown Lyman in discussing home building suggestions for the suburban residence. An attractive combination is a dark red stucco lower story with green or weathered shingles above. The roof of this type of house should be tile and should be of a sloping and rambling construction so as to bring into play all the color in the roof material to offset the upper story of the house.

Nothing is quite so attractive and suitable for a house situated on a rocky elevation or in a rolling country with rocks and trees as the background than a house with a lower story of fieldstone with an upper story of either shingles or stucco, with a tile roof to brighten the color scheme. Such a house seems to spring naturally out of its surroundings and lends itself well to the landscape. Fieldstone has a variety in color that makes it a charming foundation for a house so situated; add to this an upper story of stucco in a warm tone, perhaps decorated with trim that relieves plainness.

Frame Houses

A type of house that is suitable for almost any suburban locality is the frame house, with the exterior walls of clapboards or shingles. In building a frame house, however, it is necessary to have a design that is fitted for the site. With either clapboard or shingles an exposed foundation of brick or stone is correct. Solid concrete as well as the stucco finish on a wooden frame also lend themselves to certain styles of architectural work. A frame house should have a roof of stucco finish and should preferably be roofed with tile, in harmony with the design of the house. A great deal of attention is given nowadays to the architecture of roofs. First of all, a roof must fulfill its function of protecting the interior of the house, but it should also bear some relation to the surrounding landscape in color, and should repeat in its structure lines that harmonize with the architecture of the house.

Exterior Color Schemes

Keeping in mind the general suggestions given above—to have an eye to natural surroundings when deciding on the exterior color schemes of the house—remember that the color scheme should not be too assertive. An abundance of white, grays, soft greens and browns of various shades will always harmonize with nature. Red needs an abundance of green as a background, and only the dullest shades should be used. In the case of brick, concrete, cement and stone dwellings, the color scheme is in a sense automatic, being determined largely by the color of the materials selected. The frame house admits of greater variety of exterior color than any other material. In the shingle house the shingles are stained or oiled. The clapboard house is painted. A general rule to follow in treating the exterior is that the color or tone selected for the walls should cover all the walls and should harmonize with the roof so that the house will become a color unit in the landscape.

Specific Exterior Color Suggestions

A house which is set closely among trees should not be painted green or olive. Colors contrasting with the surroundings are better for the body of the house, but it may have green trimmings and roof if desired.

A house with shingled upper stories, as a rule, should be painted on the lower story a lighter shade than the shingles, which may be Indian red, dark brown, dark green, or some olive shade. The body should harmonize, as, for instance, light or dark olive with Indian red, cream with browns, the grays with dark green or dull red. Pure white with green trimmings is one of the prettiest color schemes for a suburban house set against a green background.

A good color scheme for the Colonial type of house is a warm buff with white trim.

Doorways and Porches

The most careful attention should be given to the architecture of this important exterior feature of the house, for the doorway, by its very character, either invites or repels. A broad, inviting doorway suggests hospitality, and, no matter how unpretentious, it should harmonize with the general architectural scheme.

The living porch should open from one of the family rooms and should have an exposure that will give plenty of air and sunlight. Such a living porch can be made to serve the purpose of a dining porch, one end of it being reserved for that purpose; but a large number of the modern suburban homes are now planned with a special dining room porch opening off the interior dining room, where an out-of-door meal may be enjoyed throughout the fine weather. Another feature of the modern suburban dwelling is the sleeping porch, built on the second story, opening off one of the bedrooms, or from an upper hall.

Doors

The door, wherever used in the house, should receive careful attention in the beginning. This will obviate later troubles of sagging, shrinking, cracking, etc. For the entrance, a single door may be used, or a double one; it may have one panel, or many, either of wood or of glass.

The new fireproof doors made of hollow steel are unusually desirable for the entrance door, and may also be used very satisfactorily throughout the house, particularly where their function is to separate one part of the house from another.

Suggestions for the Interior

After the site and style of the house have been determined, the general plan of interior decoration should be evolved.

In general, if the interior of the house is designed along severely simple lines, stain and soft, dull finish are best for the woodwork, and either plain or two-toned walls, with stencil frieze of appropriate design. When the house is of less pronounced style of architecture a wider choice is allowable. Paneling in hall and dining room, finished in some good, dark stain, is always livable, and combines well with white or ivory woodwork used on doors, stairways, moldings, etc. If the house is small the best general treatment for the interior is white woodwork.

A rule which should always be followed in all types of houses in the country is that the standing woodwork and walls of adjoining rooms must show no contrast, but harmonize well. An excellent plan is to select varying shades of the same color for the standing woodwork of the different rooms. For instance, one room may be stained in dark brown if it is well lighted, and adjoining rooms may have woodwork that is lighter brown or even silver gray.

The ceiling color is also very important. It must show a tone lighter in shade than either walls or woodwork, but harmonize with both.

Selection and Treatment of Woodwork

There is something homelike, permanent, and comfortable about the presence of much wood in a room, and more and more of it is now being used as we grow in appreciation of our native woods and their decorative possibilities for country homes. The use of beams, wainscots, paneling, in country homes is suitable and decorative, and such wonderful stains have now been perfected by the various manufacturers that charming effects can be brought out of many of our native woods, undreamed of by the average home builder. Our common gumwood is a splendid substitute for Circassian walnut, and the Louisiana red cypress or common chestnut is a splendid wood, full of color, highly figured, and almost as durable as oak. Then there are maple, beech, birch, ash and pine, all of which are excellent if properly treated with stain.

One of the first things to be remembered about the woodwork is that it must be appropriate for the kind of room in which it is to be used. The hall, living room, dining room and library can stand a good deal of woodwork and it can be of a dark tone, because the character of the room implies solidity. Such rooms should, therefore, be finished in strong fibred woods like oak, chestnut, cypress, ash or elm. For bedrooms, reception rooms or drawing rooms, where dainty furnishings are required, woods of a finer grain should be used, such as red birch, maple and gumwood, when finished in a silver gray tone.

For the floors, some good hard wood should be used and polished until it glows, never to the slippery point, for this is neither safe nor artistic.

Dry Rot of Timber

During the building of a house the danger arising from the presence of dry rot may, according to a leaflet issued by the London Board of Agriculture and Fisheries, be reduced to a minimum by taking proper precautions. A thorough system of ventilation and the avoidance of damp, stuffy places is of primary importance. The endeavor to exclude dry rot by hermetically closing all communications with the outer air in the spaces between the floor boards and joists and similar places has been practically demonstrated to be an utter failure. Perhaps the greatest source of danger arises where the ends of joists are built into a wall near the basement of a house and this is more especially true where there is evidence of red stripe in the wood. As a precaution, the ends of the joists should always be treated with creosote. Coal tar is not recommended, as its power of penetrating into the wood is limited and by forming a waterproof coating it prevents the wood from drying.

A frequent cause of trouble is the use of damp deadening material and covering it over with boards before all the moisture has evaporated. The surface of boards coming in contact with deadening material should first be painted over with methylated spirit containing corrosive sublimate in solution—six ounces to one gallon. The spirit evaporates leaving a coating of corrosive sublimate on the boards which completely destroys any mycelium coming in contact with it.

It has been proven that the spores of dry rot can only germinate in moisture containing some alkali in solution; hence coal dust, cinders, or any kind of humus should never be used for deadening or packing.

The spreading mycelium can be checked by the application of carbolic acid and when its presence is once detected all woodwork that can be reached should saturated with the same substance.

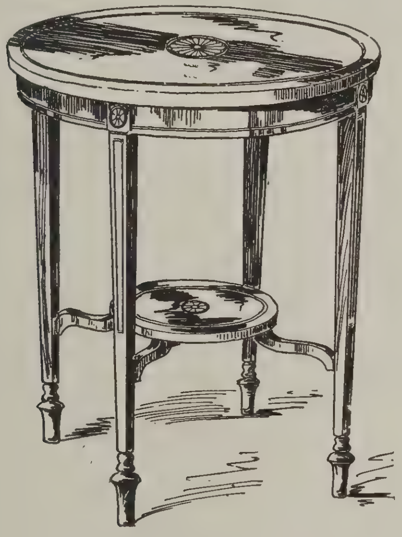
The specific name of *lacrymal* or "weeping" alludes to the power of the fungus to attract moisture from the atmosphere. Under certain conditions moisture is absorbed to such an extent that it hangs in drops or even drips from the surface of the fungus. This moisture assists very materially in rotting the timber which afterward becomes quite dry and friable. Hence the popular name "dry rot" which alludes to the last and most frequently observed stage of decay.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Details of an Inlaid Table

From Paul D. Otter, Austin, Ill.—The sketch of inlaid table which I offer may not be that for which "H. L. B." is looking but without a specific desire stated regarding inlay or marquetry, its manufacture and application, I submit this form of Sheraton center table, for the reason that it can be inlaid by a careful workman in the solid wood. He can do this either by preparing the thin strips or lines in some white wood and inserting them in grooves gouged out by a scraping tool made for the purpose, or he can buy such strips of inlay or celluloid lines from a producer of marquetry. The slight tapering panel drawn on the outside face of each leg shown in the sketch indicates the disposition of such ornament. A similar inlay or celluloid strip is sunk in the lower edge of the skirt. By setting up a cutting gauge similar to a compass, a square groove can be swung around the circumference of the table top 1 in. from the edge.


Details of an Inlaid Table

The center medallion and small medallions on the face of the posts are either from stock patterns of marquetry veneer, or they may be cut out of whitewood ⅛ of an inch thick by means of a jig saw and grouped together in the nature of a sunflower with a dark wood center.

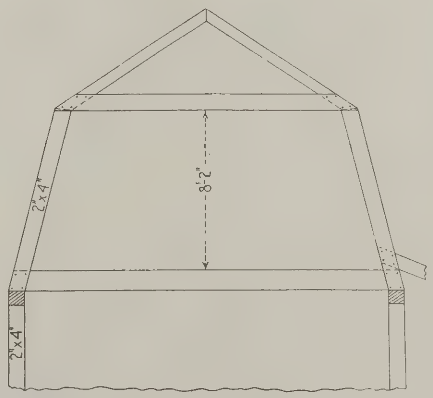
This work, of course, should be laid out by a careful drawing which can be glued on to small panels of white holly. After the small segments or petals of the flower have been sawed out and before gluing them together on a stiff thin paper scorch the edges in a careless way over a hot iron or melted lead, which will give a modified tint and likeness to a shaded flower. Do not do this too much but just enough to vary one petal from another. The point in marquetry is blending contrast.

When the flower is finally assembled in a glued-up state and routed out, a place for its reception may be made and the entire piece set in glue the wood side down. After allowing it to dry, smooth off to the surface of the table top with a smooth and low-set plane and then sand with fine sandpaper. A simple inlay of this kind sunk into a solid panel makes an enduring piece of work.

The table is 30 in. in diameter, the top 1 in. thick and the hight is 29 in. The legs are produced from 2-in. squares. The skirt or apron is 2 in. wide and set under the top ¾ of an inch. The four round skirt rails are mortised into posts set back 1/16 in.

Framing a Gambrel Roof Cottage

From D. P. Barry, Redford, N. Y.—In regard to the query of "A. J. M.," Burlington, Iowa, who wanted to know in a late issue of the paper how the rafters are framed in a gambrel roof cottage at the several joints, I am inclosing a sketch which shows the studs with the plate on which the tie beams rest. These tie beams consist of the joists for the upper floor spiked to the feet of the bottom rafters. The collar beams are lapped over the joining of the two sets of rafters. The collar beams may be spiked, however, on the bottom rafters and then raised into place and the upper set put on afterwards.



Framing a Gambrel Roof Cottage

The joists should be 2 x 10 in., the collar beams 2 x 8 in. and the studs and rafters 2 x 4 in. The lower rafters should be placed 16 in. on centers and lath may be applied to them. The top set may be placed 32 in. on centers. Gables are put in just the same as in any other style of roof.

Percentage Allowance When Ordering Flooring

From T. W., Montreal, Canada.—For several years past I have been a constant reader of *The Building Age* and would like to have some of the readers tell me through the Correspondence columns what per cent. to add when ordering 2½ x 1 in. and also 3 x 1 in. tongued and grooved hardwood flooring.

What per cent. should be added for 6 x 1 in. tongued and grooved pine flooring, and 6 x 1 in. square edge?

In laying flooring what is considered a good day's work for the average man, counting nine hours for a day?

What per cent. should be added in ordering 3-in. plank flooring dressed one side and two edges?

Answer.—In the Eastern section of the country it is the practice when ordering flooring to allow the following percentages for No. 1 stock:

2½-in. tongued and grooved flooring add 30 per cent.
3-in. tongued and grooved flooring add 28 per cent.
6-in. tongued and grooved flooring add 20 per cent.
6-in. square edge add 5 per cent.
3-in. plank flooring s.i.s. and 2 edges add 10 per cent.

For inferior stock a larger percentage allowance must be made.

Drafting with the Steel Square

From W. X. Y. Z., Westfield, Mass.—The writer has been a subscriber to *The Building Age* since 1905 and has always been much interested in the Correspondence Department. I have occasionally expressed my opinion through its columns but not very freely. I have, however, derived great benefit from the discussions and being interested in drafting as well as construction I wish to inquire how many of my brother chips, in this day when the steel square tells everything, can make a drawing showing how to get the proper bevel or cheek cut on the foot of a gable rafter, as for instance a small gable is planted on the slope of the main roof merely for appearance sake from the outside.

Another case is that of a "hog's back" or whatever one may choose to call it, back of a large chimney, the pitch of the gable not being the same as that of the main roof. Most any one can, after a trial or two, make a cut and nail it on, but what I want is a draft showing how to get the proper cut each and every time.

A Problem in Porch Construction

From C. U. F., Ong, Neb.—Will some of the practical readers advise me how to put the cornice which I shall describe on a porch. The porch is to be run around the corner of a house, and I am to use ⅝ x 3¼-in. ceiling for the plancier, the latter being 20 ins. high. I want to know how to cut the molding to prevent it from breaking when I am putting it round the cornice.

Designs Wanted for Small Hospitals

From N. E. G., Yreka, Cal.—As a subscriber of *The Building Age* I wish to express my appreciation of the January number of the paper, and I am going to suggest that you get out a special number once in a while on some other subject than residence architecture. Take up, for example, small hospital designs, schoolhouses, library buildings, etc. I would like very much indeed to see some discussion and designs of a small hospital suitable for some of the rural communities.

Note.—We shall be very glad to have our architectural friends furnish hospital designs of the nature indicated by our correspondent and to discuss those features which naturally appeal to the architect and the builder.

Features of Hall for Moving Pictures

From A. A. S., Sunapee, N. H.—I have been a reader of *The Building Age* for years but have never before come to the Correspondence Department for information. Will some of the readers give through the columns their ideas on the construction of a hall for moving pictures. What I want is the pitch of the floor and the construction and pitch of the gallery floor.

The hall is to be 20 x 70 ft. in area with a gallery 20 x 20 ft. and with about 18-ft. posts on the gallery end.

Elevations for "J. J.'s" Floor Plans

From W. E. Conklin, Boone, Iowa.—I am sending a roof plan, Fig. 1, and two elevations to suit the floor plan of "J. J.," New York City, published in the January issue. As the correspondent gives no exact measurements and no second floor plan I am guessing as to the hights of stories and location of windows in the rooms on the second floor. However, what I send will give him something to work upon.

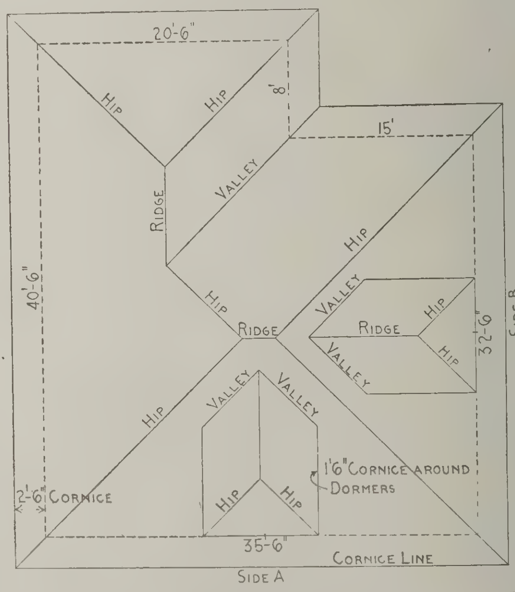


Fig. 1—Roof Plan Accompanying the Elevations of W. E. Conklin, Boone, Iowa

Elevations for "J. J.'s" Floor Plans

The elevation, Fig. 2, shows the front of the house as per the plan in the January number and represents the side "A" of the roof plan given herewith, while the other, Fig. 3, is what may be designated as the right side elevation or the side "B" of the roof plan.

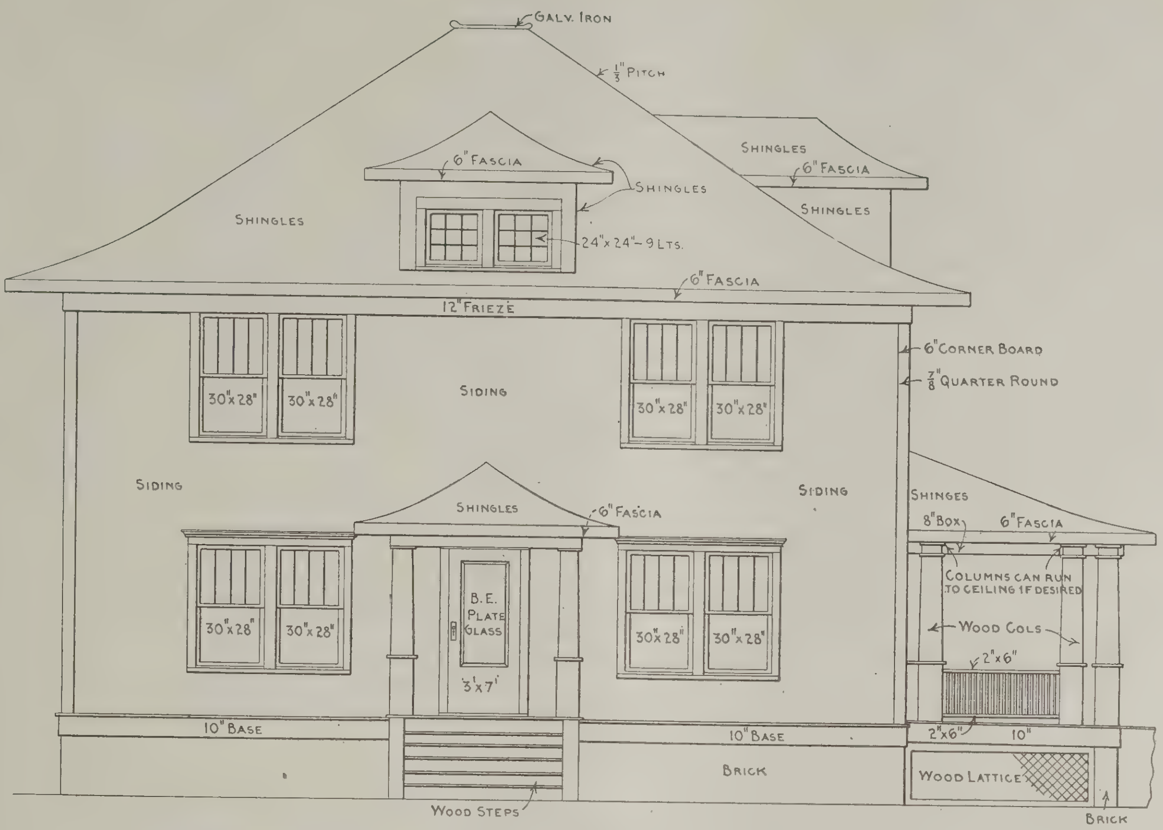


Fig. 2—Front Elevation for the Plan Shown by "J. J." in the January Issue of the Paper and for the Side Marked "A" on the Accompanying Roof Plan

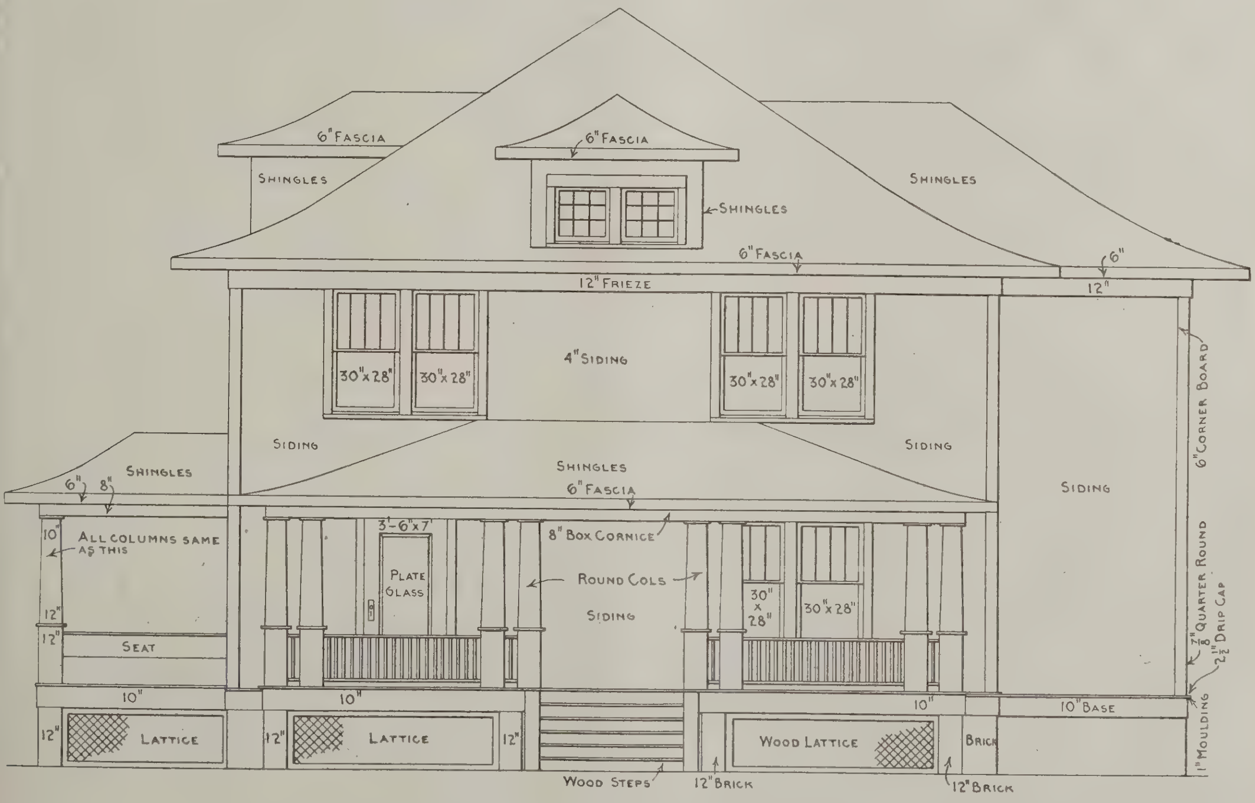
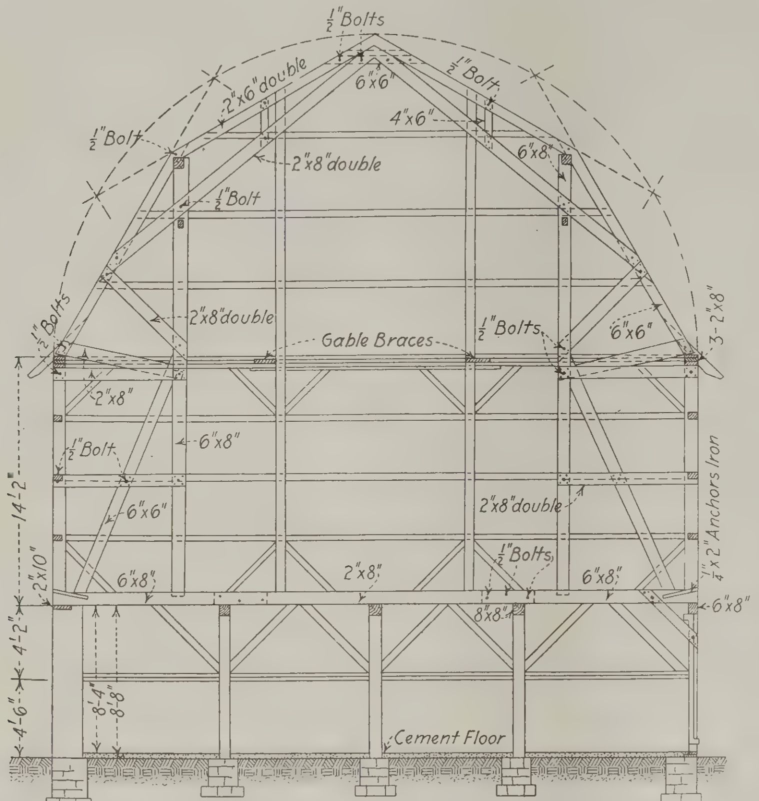


Fig. 3—The Right Side Elevation of the House and Designated by "B" on the Roof Plan

Elevations for "J. J.'s" Floor Plan—Contributed by W. E. Conklin, Boone, Iowa

Criticism Invited on Barn Framing

From F. W. & S., St. Charles, Minn.—We are sending herewith drawings showing two different barn trusses or bents which we are using in this section and which we should like to have the practical readers of *The Building Age* criticize. The drawings also show the method we use in proportioning a gambrel roof. This method makes both upper and lower rafters of exactly the same length and interchangeable.

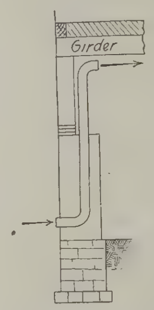


Barn Bent of Truss Showing Also Method of Proportioning a Gambrel Roof

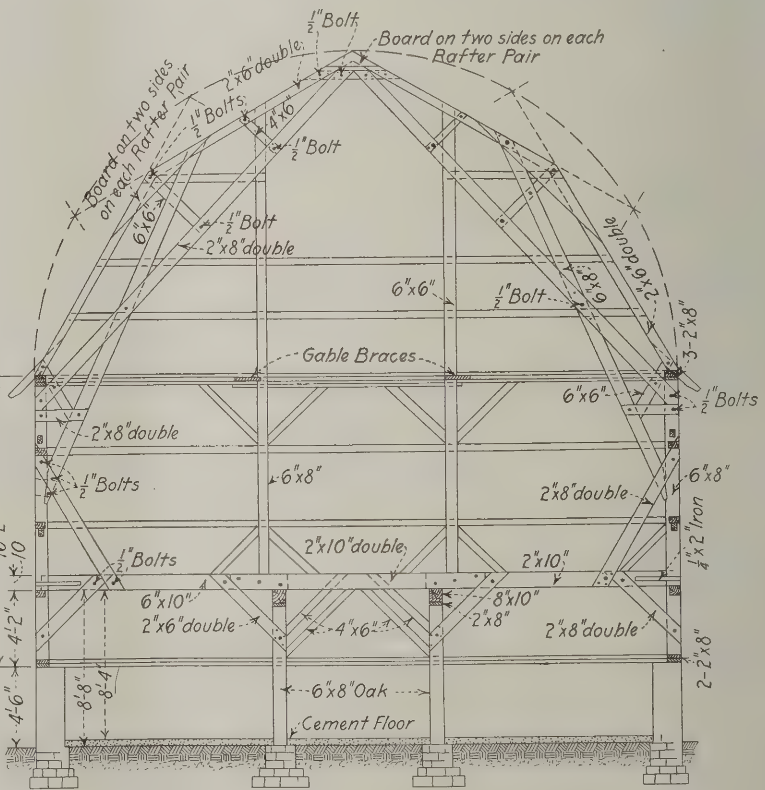
Staining Birch to Imitate Walnut

From R. A. W., Huntington, W. Va.—A question I would like to ask the readers has to do with the short article which appeared on page 43 of the January issue. It gave some information as to the manner of finishing birch to resemble mahogany. It also mentioned walnut. I would like to know if the same mixture of ingredients will produce an imitation of ordinary walnut? Birch has not the open porous effect of either mahogany or walnut, but I have seen many methods used, and, while the mahogany imitation was fairly good that of walnut was not. Burnt sienna and rose pink will not give the desired shade. One instance in particular I have in mind.

A room was partly finished in real walnut; the doors and windows were cased with walnut and the base was also of this material. A large brick mantel with a bookcase on either side was placed in the room. I believe the brick was of a light color. However, the painter, not knowing how, succeeded pretty well in spoiling the entire room. He used burnt sienna, rose pink and all the other things that might make the matching right. If any one can give me the information desired I shall be greatly obliged and it may interest others too.



Detail Showing Method of Ventilation



Barn Bent Showing Another Method of Framing as well as Proportioning the Roof

Criticism Invited on Barn Framing

I read with great interest the portions of the paper relating to the trades and industrial schools, and as I am a graduate of one of these schools, of course my interest is materially increased. Of all the trade schools mentioned, however, I never see any reference made to the one of which I was fortunate enough to have been a pupil, the Williamson School of Mechanical Trades, located about 18 miles from Philadelphia. Now, I am sure this school is one which compares very favorably with others in the country, and the success of its graduates is proof of the soundness of the theories which are there taught and put into practice.

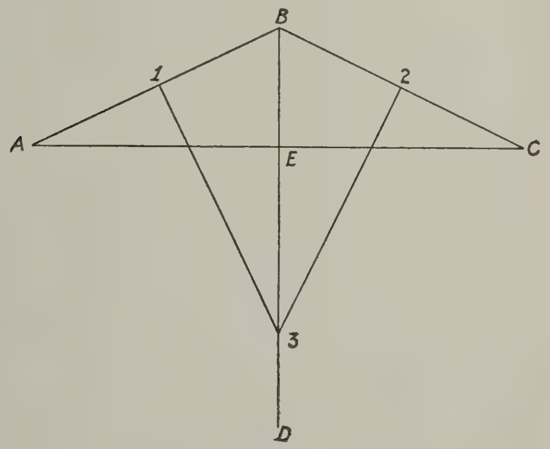
I have no doubt that many readers of *The Building Age* are graduates of the Williamson School. I first saw and read *The Building Age,* then known as *Carpentry and Building,* in the library of this school, and upon graduation subscribed to the paper and have never been without it since.

The school is unique in its way, being a free institution in every sense of the word. Unlike most "free" schools, however, the pupil or apprentice is not made to pay for his education. No hint of commercialism is seen around the place. It is, indeed, a school where a workingman of moderate means can, under certain restrictions, send his son without any cost whatever. Williamson School never advertises, and it is perhaps this reluctance to being placed before the public which accounts for its lack of mention in *The Building Age.*

Of course, it is possible that mention has been made of this school in the past and I have never noticed it. I would say that it is not because of the fact that I am a graduate of this particular school that I desire its mention, but rather I feel the Williamson School is a pioneer in the movement toward industrial education, and as such deserves unlimited credit.

Finding Radius of Circle

From C. H. S., Paynesville, Ohio.—I am sending a sketch which may be of interest to "D. G.," Winnebago, Minn., and which illustrates the method I have used for a long time in finding the radius of a circle when the segment, the length of the chord and the hight of the segment are given. Referring to the diagram *A-C* or the chord, and at right angles with this line draw *B-D.* Now let *B-E* represent the hight of the segment and draw the lines *A-B* and *B-C.* From the center of these lines and at right angles with them draw 1-3 and 2-3, intersecting the line *B-D* in the point 3. Then 3 becomes the center of the circle and the lines 1-3 and 2-3 the radii.



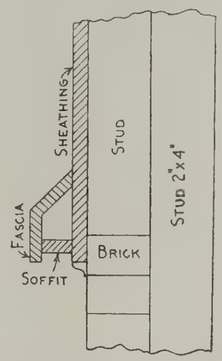
Finding Radius of a Circle

Articles on Gothic Drawing

From F. H. S., Bogville, Ore.—Some time ago you ran a series of articles on Architectural Drafting which I followed with much interest. I should like very much if you would publish an article or two on drawing in the Gothic style, more particularly, complicated window tracery and how to find the centers.

Brick Veneer and Lap Siding Construction

From D. P. B., Redford, N. Y.—In answer to the inquiry of "H. R. F.," Mildred, Kansas, in the February issue, I send a sketch showing a method for doing his job. He will find it advantageous to sheath on the outside of the studs above the brick. The accompanying sketch shows a 3-in. soffit under the sheathing, a bed mold and facia. The projection may be shingled and flashed with copper or coppered iron.



Brick Veneer and Lap Siding Construction

Check as Final Settlement

From M. K., Newark, N. J.—Does the endorsement of a check and the acceptance of the same in the following manner constitute a receipt and settlement in full? For instance, A enters into an agreement with B for a contract for the sum of $500, and in accordance with his contract, A applies to B for final settlement. We shall say that there are some differences at the completion of the contract, as debits and credits, amounting to $25 in dispute, which at this time should not hold up the final payment and enter this question. A needs the money badly and B knows it. B has an idea that he can force a settlement to his terms, which are grossly unjust, by offering a check for $475 to A, and on the back of the check this phrase is inscribed: "An endorsement of this check is an acknowledgment of the receipt of all claims in full to date." A accepts the check and can prove his claim for the sum of $25, for which he later brings suit. Has A any redress in court for the said sum of $25? There are many lawyers who differ on this question, and there were also different decisions by the courts. The point in question is becoming a common practice, and it is my opinion that such practice is a conspiracy to defraud. Is there a law that covers this point?

Answer.—On the facts stated, I am of the opinion that A is morally, but not legally, entitled to recover the $25. This opinion is based, however, upon an assumption that B had some colorable ground for claiming a deduction of $25 from the contract price, such as a claim that the work was not performed according to contract, although this claim might be decided against him on litigation.

The decisions of the highest courts are fairly unanimous in holding the following propositions: Where a certain amount is indisputably due, as where one promises to pay a certain sum for work or property which he has received at the time of making the promise, a subsequent agreement to receive a smaller amount in full settlement is unenforceable as being without consideration. But where no definite amount is agree upon as the price of goods or services, or if, where a definite price is agreed upon, the debtor insists that he should not pay the full amount on account of some defect in the work or goods, and he offers a certain amount in full settlement, retention and cashing of a check containing such an endorsement as that above mentioned constitutes what is known in law as an "accord and satisfaction," and bars suit for any balance. The law takes the view that settlement of a good faith dispute is sufficient consideration for the release of further claim, and that if the creditor is not willing to receive the check as a final discharge of his claim, he should reject it and sue for the full amount. From one view this rule may seem unfair, but it places the creditor in no worse situation than when the debtor refuses to pay any part of a claim, and thus forces the creditor to sue for the full amount.

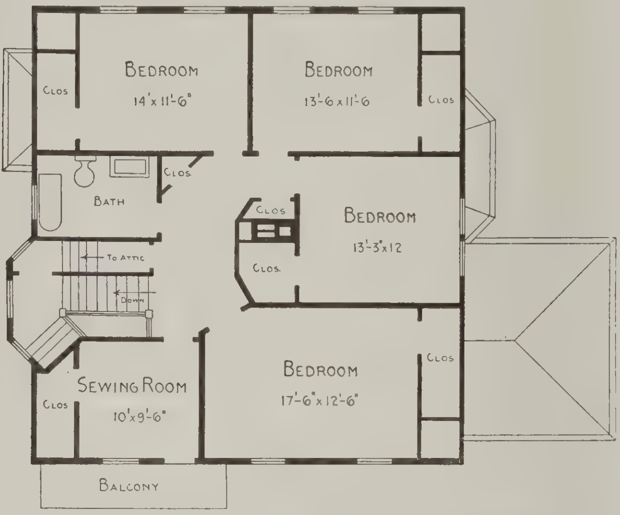


Fig. 2—Second Floor—Scale 1/16 In. to the Foot

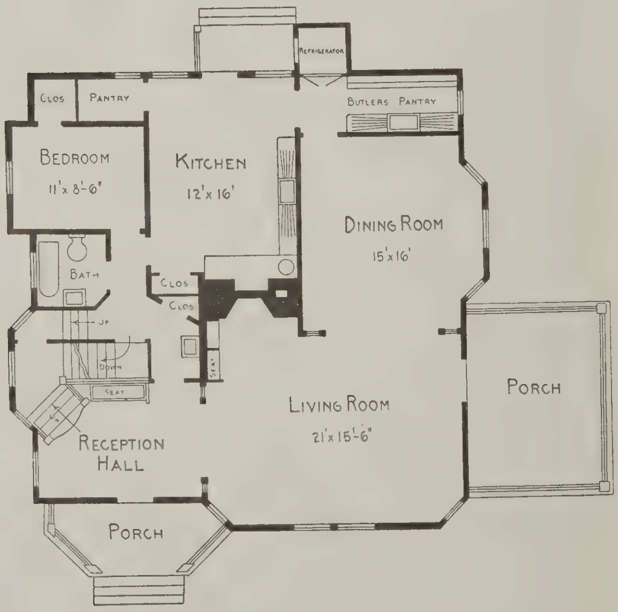


Fig. 1—First floor—Scale 1/16 In. to the Foot

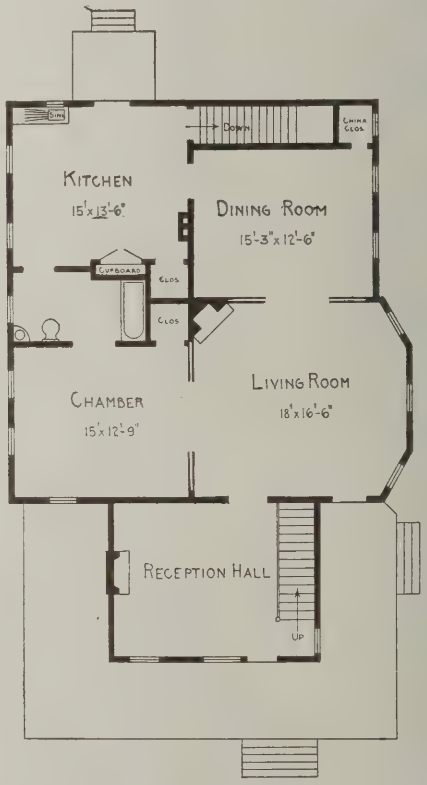


Fig. 3—Main Floor—Scale 1/16 In. to the Foot

Plans for a Modern Home—Contributed by Various Correspondents

I am quite sure that the facts above stated do not constitute a "conspiracy to defraud," since a conspiracy exists only when *two* or *more* persons agree together to do an unlawful act.

The case presented by the New Jersey correspondent illustrates a situation where, to my mind, litigation should be avoided. In the first place, A is almost sure to be defeated. Should he win his suit, he would still be loser, after deducting fees paid his attorney and other expense and worry in prosecuting the suit. In any event, "fighting for principle" in such a case reminds me of the Italian vendor of plaster statuettes who, on meeting an intoxicated American pedestrian, offered to sell him a cast of Garibaldi, the Italian patriot. Dashing the statuette to the sidewalk, the pedestrian said: "To h—— with your Garibaldi." Thereupon, the offended Italian, seizing upon a cast of George Washington in his own basket, hurled it to the sidewalk, shouting: "You say to hella with my Garibaldi; I say to hella with your George Wash."

A. L. H. Street.

Plans for a Modern Home

From W. A. Wheeler, New Canaan, Conn.—On page 55 of the February issue of *The Building Age* there appeared a request from a correspondent signing himself "A. B.," Union City, Pa., with regard to plans for a modern home. He stated that he wanted to build a house on a lot 70 x 80 ft., the front of the house to face the west. On the first floor he wanted a reception hall, living room, dining room, kitchen and bedroom and a bath room, the living room to have mantel and fireplace. On the second floor he wanted sleeping rooms and possibly a sewing room.

In reply to these requirements I am enclosing plans, Figs. 1 and 2, which may be of interest to him. I designed the elevations so as to have the second floor in the roof. There will be gables north and south with a small gable over the balcony and a flat dormer over the southwest bedroom also on the rear. What I had in mind was to finish the first story in stucco and treat with shingles above.

From D. P. Barry, Redford, N. Y.—I am sending the first floor plan, Fig. 3, showing what, in my estimation, a modern house should be and trust that it will prove of interest to "A. B.," Union City, Pa., whose inquiry appeared on page 55 of the February issue. The second story will work out easily to suit the correspondent. If the reception hall is too large he may cut it down; also the piazza. If the lower bedroom and bath room are too large he can easily modify them, and so with the fireplace in the reception hall. Sliding doors are intended to be used between the living room, dining room and chamber.

From H. E. Freeman, New York City.—Referring to the query of "A. B.," Union City, Pa., I offer first and second floor plans, shown in Figs. 4 and 5, which I hope will prove satisfactory to

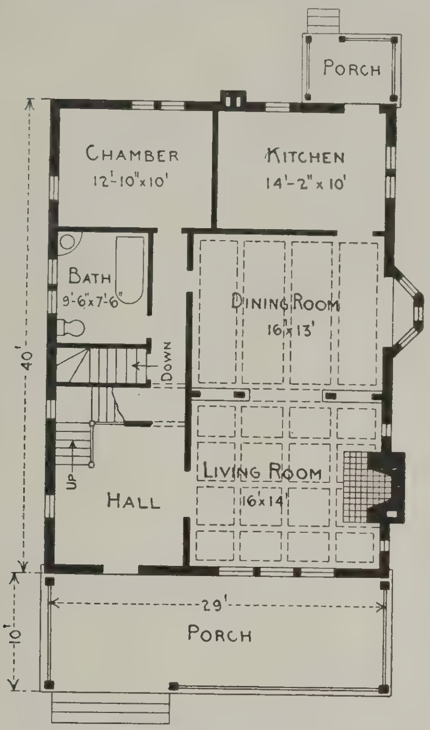


Fig. 4—First Floor Plan of Mr. Freeman

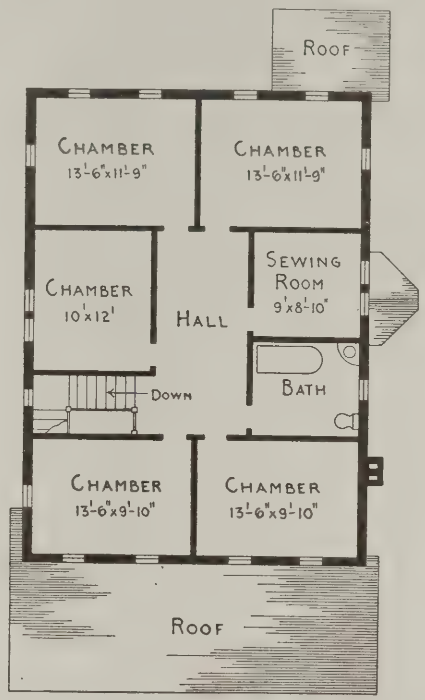


Fig. 5—Second Floor Plan of Mr. Freeman

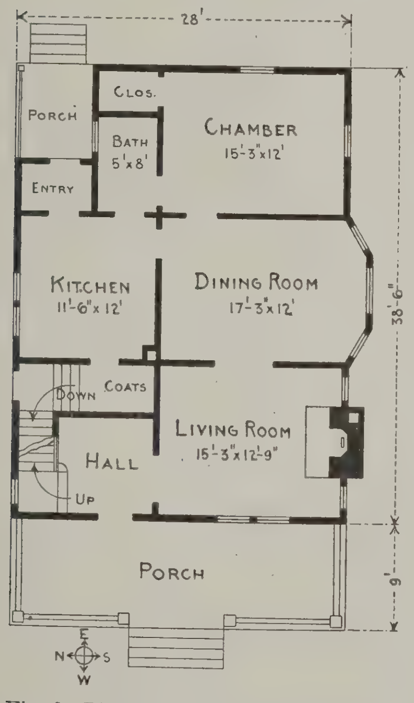


Fig. 6—First Floor Plan of Mr. Conklin

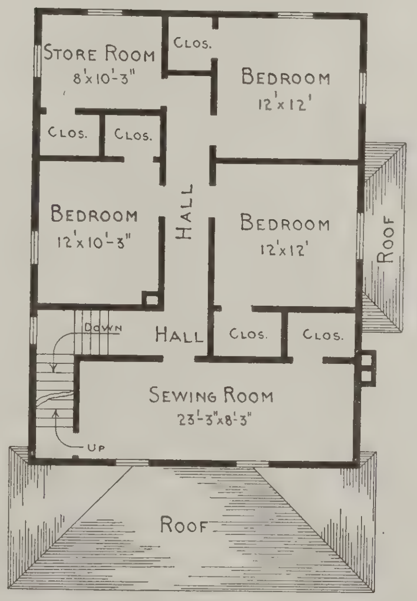


Fig. 7—Second Floor Plan of Mr. Conklin

Plans for a Modern Home—Contributed by Various Correspondents—Scale 1/16 in. to the Foot him. The arrangement of rooms is so clearly indicated that further comment would seem to be unnecessary.

From W. E. Conklin, Boone, Iowa.—I am sending plans, Figs. 6 and 7, which I trust may be of benefit to "A. B.," of Union City, Pa., whose inquiry appeared in a recent issue. I am inclined to think the plan will interest him as it has been drawn to meet the requirements as regards rooms given in his inquiry.

Construction of Cabinet Maker's Work Bench

From C. E. P., Provo, Utah.—I wish some reader of the paper would send to the editor for publication drawings and description showing how to construct a cabinet maker's work bench 11 ft. long with side and end screws. I would like it strictly up to date. I would suggest that the data cover Oregon fir as the material of which it is to be made.

Answer.—As the length of work bench wanted is so extreme we are basing the illustrations on the standard length so that the correspondent may arrange for any length he desires. If for 11 ft. over all a middle leg framing should be considered and a front and back width of not less than 36 in. Whatever the wood used, the top front plank should preferably be of maple not less than 2 in. thick and better still consist of ⅞-in. strips glued up into a plank 2 or 2½ in. thick when dressed.

Referring to the drawings it should be stated that the width is 13 in. A ¾-in. board bottom fills up the rest of the space to the back board. This forms a sunken tray for tools and other things out of line with the top of the bench. The front cheek and two end cheeks are of 2 x 6-in. maple or hardwood material dovetailed, as shown, on four corners. In making a much longer and wider bench it might be well to use posts 4 x 4 in. or 2 x 6 in. These and the strainer rails and peg board may be of Oregon fir or similar wood mortised and tenoned, as shown. A system of corner blocking to the legs and under side of top should be considered for increased stiffness. The legs, front and back are joined by a full tenoned 2 x 2-in. rail and the upper rail, not shown, should be 2 x 4 in. fitted in the same manner to receive the top.

The drawing, Fig. 1, shows end vise 2½ x 14 in. working up to the end cheek of hardwood by means of an iron bench screw 1¼ x 18 in., fitting a hole in the position indicated in the cross section, Fig. 2. To the right of this is secured to the bottom of the bench a three-piece running guide to guide a 2 x 2½-in. runner, which is double tenoned through the screw cheek 8 in. away from the center of the bench screw. This guide working smoothly but loosely in the guide box, holds the vise parallel.

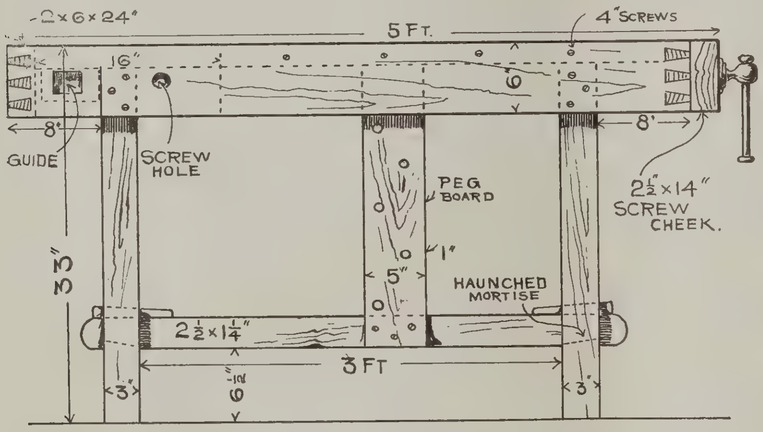


Fig. 1—Front Elevation of the Bench Showing Construction

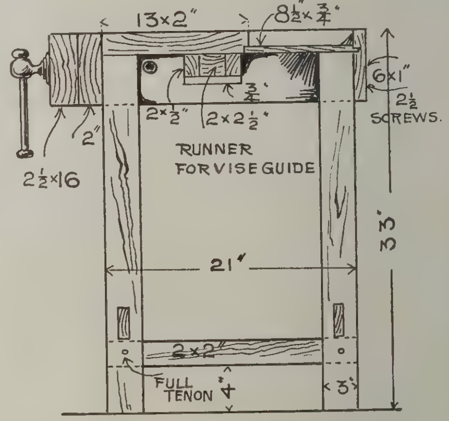


Fig. 2—End View of Bench

Construction of a Cabinet Maker's Work Bench

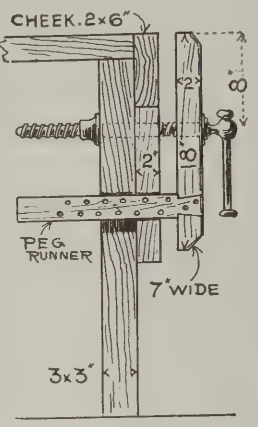


Fig. 3—Details of Upright Vise

Provision has been made in front, Fig. 1, for a similar vise 16 in. long, the drawing showing the screw hole and the guide runner hole.

It is a question whether the upright vise of wood construction shown in side elevation, Fig. 3, will not prove more desirable. In this form the front post would then be built out flush with the front cheek plate by a piece 2 x 7 x 13 in. and the bench screw hole located 8 in. from the top through this and the post. The drawing shows other details with holes in sliding guide to set the peg at various spacings to accommodate stock held in the upper part of the jaw.

The two forms of vises shown are very satisfactory, the large old wood screw being supplanted by the steel screw here indicated. In later years, however, various makes of quick-acting all-steel vises are to be recommended for pattern and cabinet makers purposes; also the 5 or 6-in. parallel steel vise of the machinist type finds favor among woodworkers for its strength to stand any kind of work. Wood or leather protectors are slipped over the jaws to avoid denting the wood. Such a vise is ever at hand in these times when a woodworker so frequently has to deal with metal work.

As to a bench stop the old kind made of a 1⅛-in. square hardwood peg fitting in a tight hole is the best form as a precaution against damage to plane bits. This can be located at the head of the work bench and similar holes for its reception can be provided for near the edge of the bench at intervals of 8 or 10 in. apart, a hole also being cut in the end screw cheek.

Paul D. Otter.

New Auditorium at Panama Exposition

Details of Construction of Building Which Is to Be a Permanent Monument of the Panama-Pacific Exposition

Waldemar H. F. N. de Bille

As a permanent monument of the Panama-Pacific International Exposition an auditorium is being constructed in the new Civic Center of San Francisco which will cost more than $1,300,000, the architectural features of which differ somewhat from the usual type and the method of construction is decidedly unique.

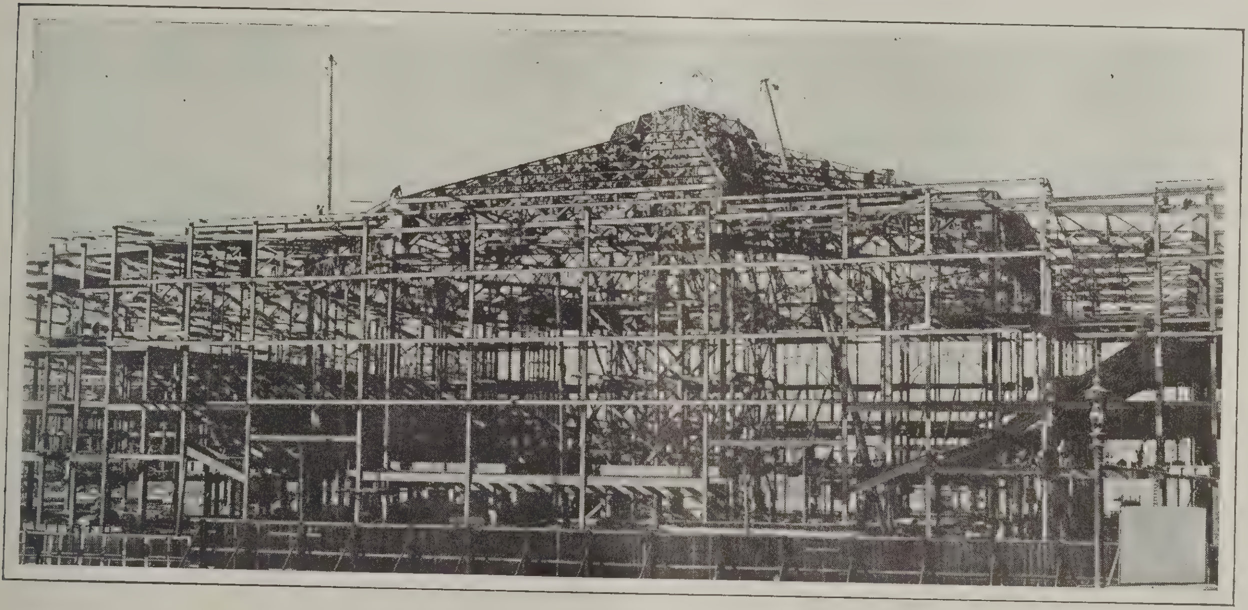
As will be seen by the plan the structure consists of a main hall with a wing on either side in which are other smaller halls, exhibit rooms and committee rooms and offices. The building is 402 feet long and 165 feet wide. The main hall is 200 by 200 feet in size with a gallery on three sides, and is surmounted by an octagonal shaped dome 108 feet high to center and 200 feet in diameter.

This main hall has a capacity for comfortably seating 10,000 people and may be increased by crowding to 12,000. This, of course, includes the gallery with a seating capacity of 6,000.

The principal feature of the building is the method of construction of the dome which has no thrust on the building itself, all of the thrust being taken up by an eye-bar ring. The entire weight of the dome is supported by eight main columns.

The steel work will be left uncovered and the trusses and gusset plates have been made symmetrical. Allowance for elasticity has been made at the rate of three-thirty-seconds of an inch per panel, or one-half inch per column, or a total of 4 in.

In constructing the dome the columns were pulled over at the top a trifle and not made plumb. In the center of the structure a platform was erected slightly higher than the normal height of the trusses riveted together upon it. When the platform was removed the dome sagged, bringing the trusses to their normal position and the columns plumb. One of the photographs shows this platform with trusses about to be placed. This method has never been attempted before to the knowledge of the engineers in charge. The building has been designed by the city architect, John G. Howard, Frederick H. Meyer and John Reid, Jr., and the principal problem to be solved by them was the laying out of plans which would include the wings and the many incidental features which were specified in the demands of the Exposition. The construction of an ordinary auditorium would have been simple, but with these added features much difficulty was encountered.



The New Auditorium of the Panama-Pacific Exposition—The Steel Framework Completed

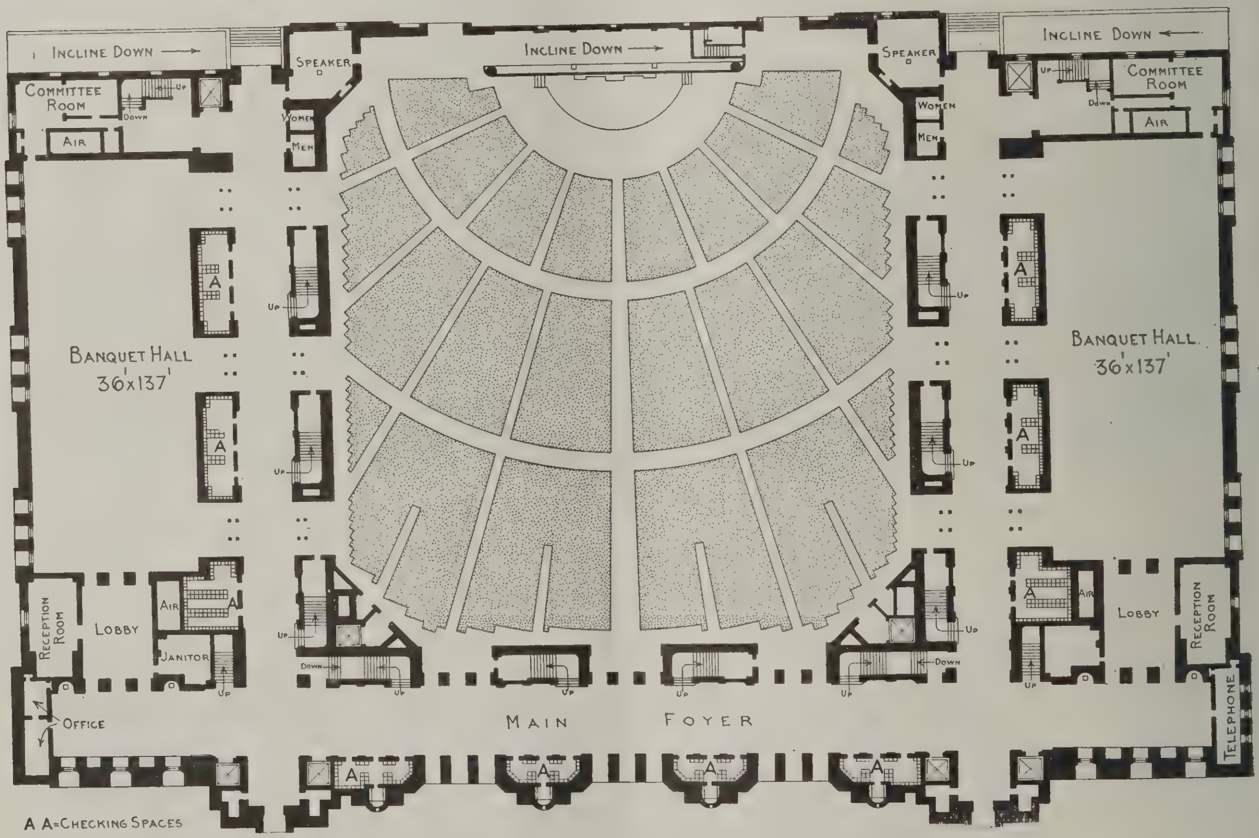
It was considered necessary to provide for the ready transformation of the main auditorium from a hall for speakers into a ball-room or even a stadium for the presentation of horse-shows.

For this latter two inclined driveways were constructed from the basement with hitching-up arrangements below, and a straight-away in the main hall. It is estimated that 200 horses can be provided for. Collapsible seats will be installed on the floor which can be removed at will. The gallery seats, however, will be permanent.

As the hall is intended for various purposes, the line of sight from the galleries had necessarily to be greater than had it been intended only for a convention hall or theatre. At a ball or horse-show it is imperative that those seated in the galleries be given an extensive view of the floor itself, instead of just the rear of the hall, where the stage is located. It was finally arranged so that 100 feet of the floor was visible in cross-section from every gallery seat and 150 feet in a north and south line.

Showing Details of the Dome Construction with Erecting Scaffold

Seventeen entrances have been provided for in the front of the building facing the square and four on each side. Each entrance has in the rear, toward the halls, its own checking space for hats, coats, etc., and a set of stairs and elevators. It is possible under this arrangement—with the added stairs in each section of the main hall—for a person to enter at the door nearest the section which his ticket calls for, and go directly to the seat without having to pass around any other portion of the building resulting in the saving of steps.



Main Floor Plan of the New Auditorium at the Panama-Pacific Exposition

In the case of panic or fire the building can be emptied in an exceptionally short space of time. Fifteen great groups of exits have been provided with a total of sixty double doors.

The main hall has been arranged in such a manner that the vastness of the structure is not apparent either to a speaker upon the platform or to the auditors in the seats. In contradistinction to the longitudinal plan of construction usual in auditoriums the octagonal shape of the central hall brings the line of vision within 175 feet and can be reduced to 100 feet.

The architectural composition is essentially of the French Renaissance period and is quite classical in design. The exterior will be of white California granite. A marquise, 200 feet long projecting 25 feet, constructed of glass and steel will add to the effect of the front façade.

The day lighting is provided for by an octagonal skylight, seventy-five feet in diameter. Artificial lighting by night is by the semi-indirect method, with 500-watt tungsten lamps shielded by cone reflectors, and placed at intervals of 18 inches in a central ring of the dome, 40 feet in diameter.

Toilets have been provided on the basement floor, and at various points on the other floors.

Exhibits at the Chicago Cement Show

Some of the Many Attractive Displays Which Were of Special Interest to the Patrons of "The Building Age"

WHEN the seventh annual Cement Show terminated on Saturday, February 21 after occupying the Chicago Coliseum for ten days it marked the close of one of the most successful gatherings ever brought about in the interests of the cement and concrete industry. Apart from the features of the show itself the occasion is always important by reason of the independent associations that surround this annual celebration for promoting the use of concrete and the sale of fireproofing materials. The several conventions held during the progress of the show have become a recognized part of it as a means of attracting men from every part of the country who are vitally interested in cement and concrete machinery. While the exhibition was not as large as some of its predecessors the 1914 cement show outranked all others in the character of the exhibits and the quality of the machinery displayed.

The decorations throughout the Coliseum were of material aid to all of the 135 exhibitors. The general appearance of the hall as shown in the half tone engraving upon this page is a practical demonstration of the popularity of this annual event, the artistic beauty throughout causing much favorable comment on the part of all concerned.

It is most interesting to note the advance of the annual output of cement since 1895, in which year it was 990,324 barrels, while in 1913 the number of barrels is estimated at 90,000,000. The advantages of concrete at the show were displayed in large lettered signs around the Coliseum reading:

"No Painting; No Insurance; No Depreciation; Permanent; Fireproof and Sanitary."

Of the exhibitors those displaying concrete mixers were in the majority, but in addition to these there were large spaces devoted to the display of contractors' equipment, such as barrows, saws, etc.,

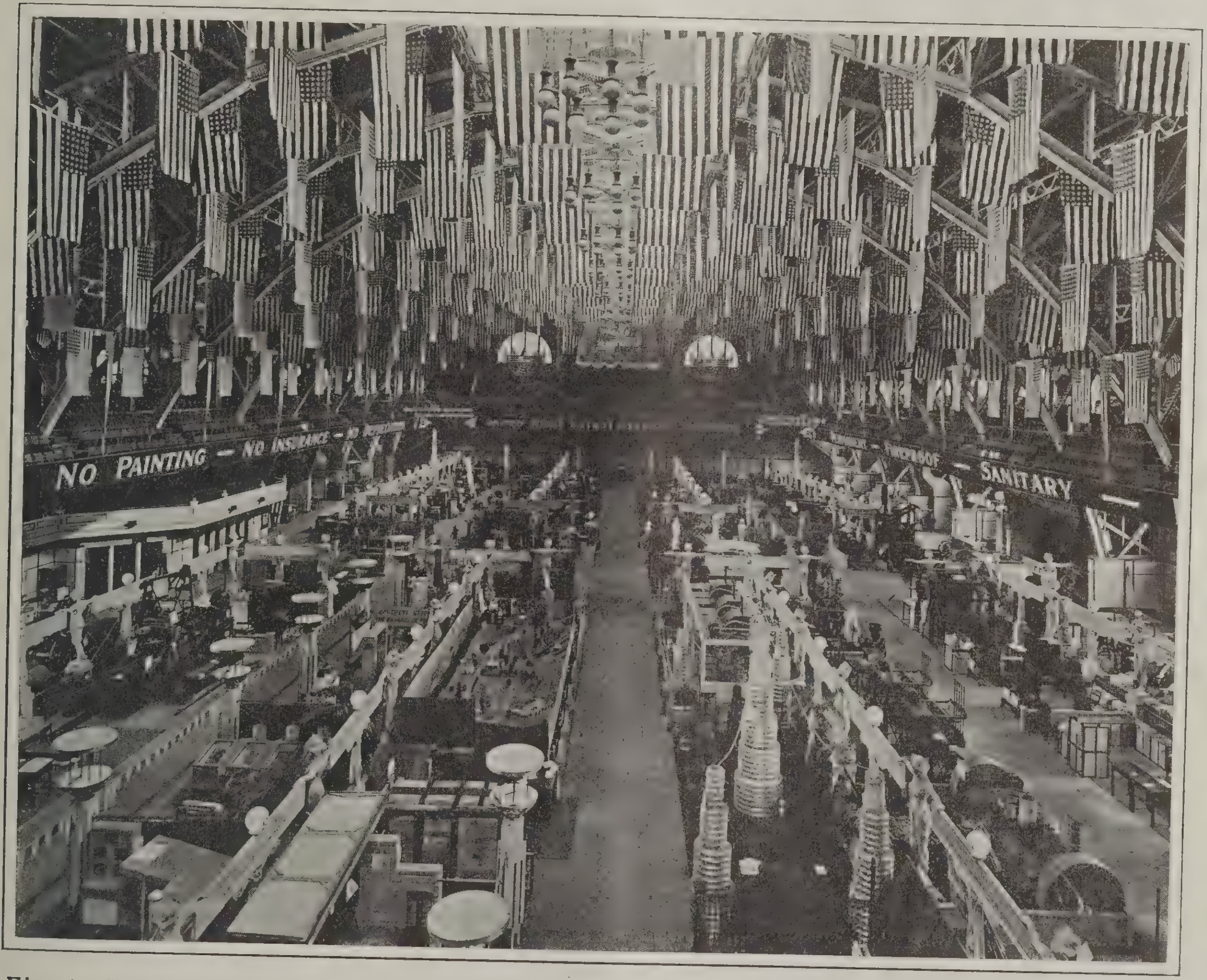


Fig. 1—Interior View of the Coliseum at Chicago Indicating the General Arrangement of Exhibits During the Recent Cement Show

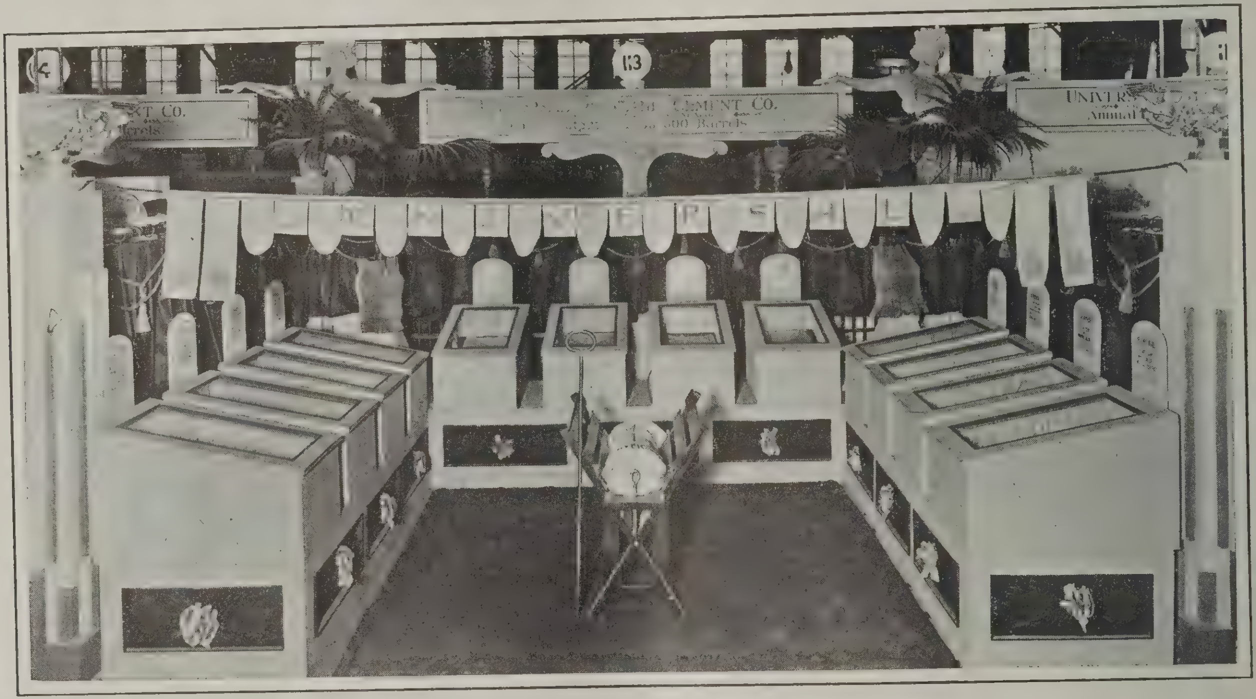
while crushers, all kinds of "forms," brick machines, etc., were well represented.

One of the features in which the general public participated was the competition for a "Honeymoon Bungalow." The governing rules did not call for a plan of the proposed home, but consisted in the main of suggestions as to what constitutes a model residence in comfort and general facilities. Miss Neta V. Peterson, a stenographer, won the prize because of the "Home touch" in her design for a $2,000 bungalow. The prize was the materials for building a home as she planned.

Among the ideas presented in the letter transmitting these sketches were the following:

> "I don't want to spend my first year's salary for coal. I don't want to be repairing the sills and painting the walls every year."
>
> "A cement house does not have to be square like a box."
>
> "Too many houses are built nowadays without clothes presses upstairs—or at least with such small ones that the trunk has to go into the attic."
>
> "I never did see why a basement should be one great big barnlike room. Too many houses have too much basement space dug out that is not needed."
>
> "The things that make up the comfortable home are, to my notion, a comfortable living room with plenty of space to store away things like coats, hats, umbrellas, brooms, dusters, extra table leaves, and the thousand and one other things necessary in housekeeping which don't look well in sight."

The Universal Portland Cement Company of Chicago and Pittsburg was prominently represented with eleven booths. These consisted in the main of illustrating the architectural possibilities of Portland cement and cement products; the water-tightness of properly made concrete; the value of concrete as a fireproof structural material and the need of concrete roads. On all these subjects interesting literature was available to visitors, while an army of the company's representatives was always ready to explain the advantages of "Universal" products. In Fig. 2 of the illustrations we present one of the features of the Universal exhibit in the form of a morgue. This depicted in small graves how sacks containing Portland cement met their death by careless usage, etc. Each of the sacks' death was described on a tombstone.

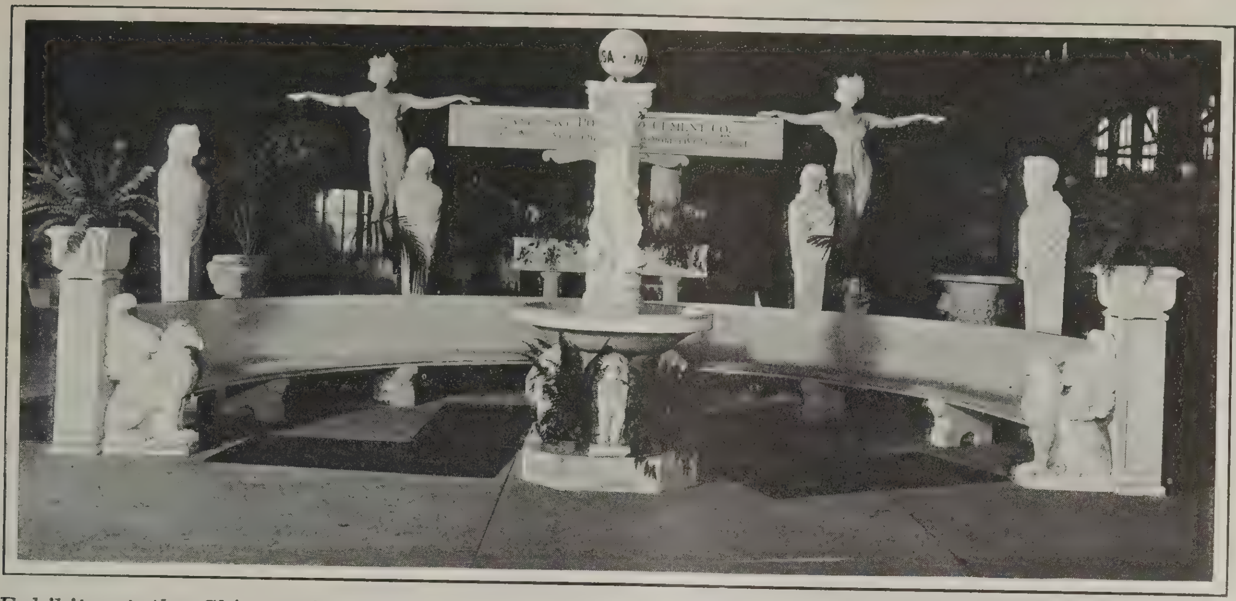


Exhibits at the Chicago Cement Show—Fig. 2—One of the Eleven Booths of the Universal Portland Cement Company Arranged in the Form of a "Morgue" for Cement Sacks

Booth 110 showed samples of pit-run gravel before and after screening; booth 112, was interesting to farmers as it showed a model concrete barn. The remaining booths were all of educational value and collectively they formed one of the striking features of the exhibition.

Four excellent models of modern woodworking machinery were the means of attracting contractors to the booth of the American Saw Mill Machinery Co. of Hackettstown, N. J. The machines displayed consisted of the company's "Novelty" rip and cut-off saw; a "Jewel" surface planer; a No. 3 portable saw mill, and a portable "Variety" woodworker. The latter machine probably attracted the most attention. This machine is so constructed that four men can work at the same time without interfering with each other, at sawing, joining or planing, boring and scroll sawing. The equipment on this outfit consists of a 7 hp. engine, with batteries, etc., endless driving belt, rip and cut-off gauges, one 14-in. rip saw and 14-in. cut-off saw, and numerous other devices. It is constructed substantially, being made of 3½-in. sq. seasoned hardwood, well bolted together, with an iron top, measuring 54 x 30 in. W. E. Swanger, manager, was in charge of the booth, ably assisted by E. J. Johnson, W. McDaniels and Edward Crainer.

"Broncho" mixers having a capacity of a batch a minute were displayed advantageously by the Lansing Company of Lansing, Mich. W. G. Jenkins and C. H. Kellar, manager of the Memphis, Tenn., branch, pointed out by practical demonstrations that using the "Broncho" assured cheap, thorough and more uniform mixing. This machine is especially constructed for contractors' use on account of its light weight and wide gauge, which enables it to

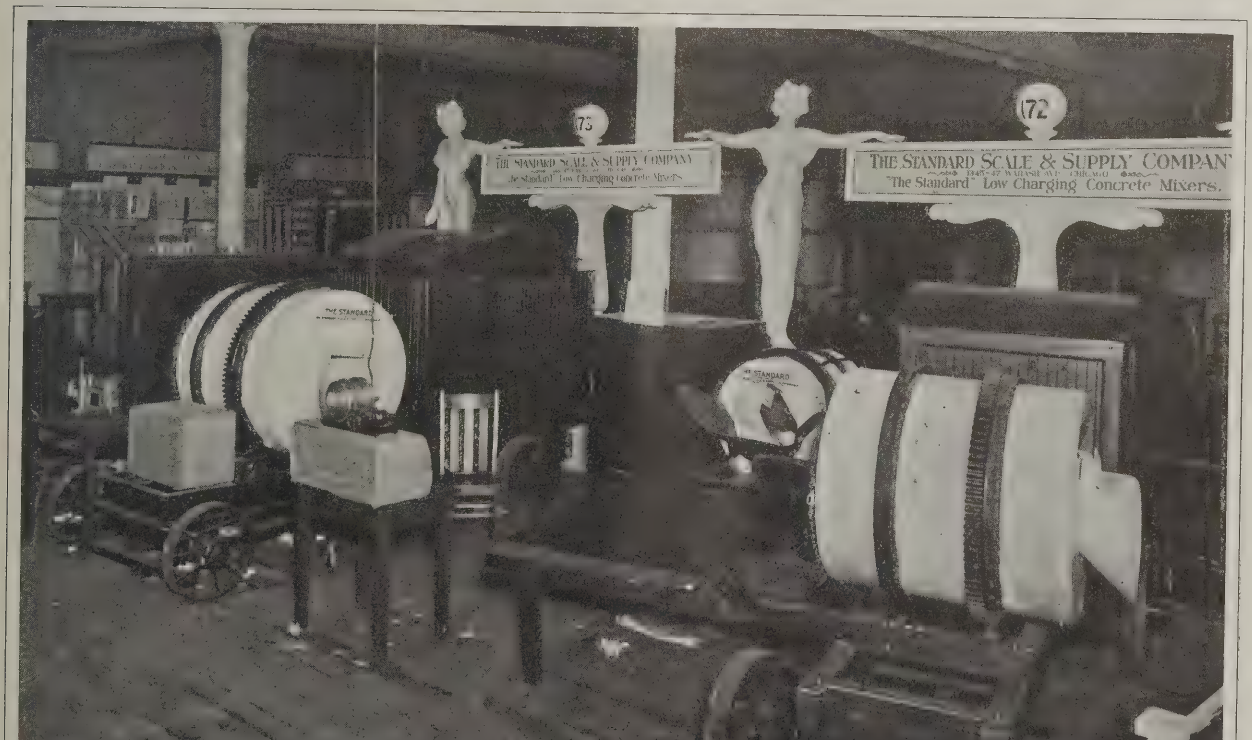


Exhibits at the Chicago Cement Show—Fig. 3—An Artistic Display Showing the Possibilities of "Medusa" White Portland Cement

be moved around with ease, while at the same time its construction is such that it will stand considerable rough wear.

The possibilities of "Medusa" white Portland cement were brought out advantageously in ornamental architectural specialities displayed by the Sandusky Portland Cement Co., Sandusky, Ohio, and illustrated in Fig. 3 of the pictures. H. D. Jenkins, Chicago representative, assisted by many territorial and home office representatives, were on hand to explain and convince. This large booth was a haven of refuge to those who circuited the Coliseum a number of times on account of splendid seating facilities that were provided consisting of a long semicircular seat of concrete, made of "Medusa" Portland cement. Other architectural structures were introduced making the exhibit one of the most attractive in the exposition.

The Standard Scale and Supply Co. of Chicago, Ill., was well represented by a display, Fig. 4, of concrete mixers, hoists and general contractors' machinery. The double booth showed three types of the company's mixers that are especially adapted for contracts where the mixer is moved frequently as the work progresses. One mixer was shown with a folding platform in front of the drum for convenience in moving. The mixers are also featured by having especially large drums which enables the operator to inspect the batch while mixing. Messrs. Simpson, Bayles, Reed and Devore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THE STANDARD SCALE & SUPPLY COMPANY
172
THE STANDARD SCALE & SUPPLY COMPAN
"The Standard" Low Charging Concrete Mixers.

Fig. 4—The Display of Concrete Mixers Made by the Standard Scale & Supply Company

distributed the company's literature and were prominently active in explaining the merits of the products exhibited.

The display of the Lehigh Portland Cement Company of Allentown, Pa., attracted considerable attention from both exhibitors, prospective customers and the general public on account of its unique character. The model, as shown in Fig. 5 of the accompanying illustrations indicated at one end of the exhibit a cement stockhouse where freight cars were being automatically loaded with cement. The cars were pulled over a railroad to a concrete wharf where a ship lay in the river. From the wharf the cement was automatically loaded on to the ship. Another railroad ran through country where all buildings were constructed of cement. In addition the railroad stations, roads, telegraph poles, etc., were all of concrete. The idea of this exhibit was conceived by Bert Swett of this company, and the setting was accomplished by Howard Rhode.

Fireproof construction by means of hollow walls was demonstrated to perfection by the Van Guilder Hollow Wall Co., 712 Chamber of Commerce Building, Rochester, N. Y., whose exhibit showed a complete model of the machines used in this form of construction. These machines provide two walls with a continuous air space between them, and in the case of ice houses and cold storage buildings, three walls, each with the continuous air space, thus constituting a fireproof structure of jointless walls. The latter are securely tied together across the air space by galvanized steel rods, the walls being thoroughly reinforced horizontally through the center of each 9 1-3-in. course with steel which encircles the building. This effectually counteracts any tendency to crack caused by the expansion and contraction of the walls. The booth was tastefully decorated with pictures of buildings where this form of construction has been employed. President W. H. Van Guilder, aided by his son, H. K., distributed catalogs and instruction books to the numerous visitors.

An exceptionally large booth was maintained by the Oshkosh Manufacturing Co., Oshkosh, Wis., in the presentation of its well known products, consisting of its "Eveready" portable saw rig, its concrete mixers and portable pumping outfits. Considerable attention was given to the featuring of the saw rig which has so many advantageous points of interest to the general contractor. This combination rig is substantially constructed and is of modern design, the frame complete standing 36 in. high, with a table 42 in. long. The jointer attachment is on the opposite end of the arbor from the saw so that both attachments can be used at the same time. An engine of special design is provided guaranteed to develop over four hp. Other features include a 1¼-in. steel arbor, belt tightener, jig saw, sander, 10-in. rip and cross cut saws and special boring attachment. Elmer Leach, president of the company, was in attendance to demonstrate the workings of this outfit, and his assistants were Charles A. Bush, E. C. Leach, A. M. Anderson, W. L. Yundt and W. W. Duprez.

Exhibits at the Chicago Cement Show—Fig. 5—The Very Clever Display of the Lehigh Portland Cement Company Showing Models of Concrete Buildings of Various Kinds

The George B. Carpenter Co., Chicago, was one of the large exhibitors with a complete line of builders' and contractors' supplies. These consisted chiefly of chain hoists and travelers, while considerable space was devoted to displaying several specimens of rope and a power-driven bilge pump. A view of this display is presented in Fig. 6 of the pictures on the opposite page.

The waterproofing features of "Ceresit," a product of the Ceresit Waterproofing Co., Chicago, Ill., was shown in a rather interesting presentation of a model house that had been "Ceresitized." This consisted of a small house of which a sectional view was shown, revolving on a fixed stand. The house was made of cement and treated with "Ceresit". Two streams of water played on the exterior throughout the day, and the interior dryness proved the effectiveness of "Ceresit" waterproofing. It was explained that "Ceresit" is also especially adaptable for application to farm buildings, such as silos, etc., as a successful enemy of dampness. Manager F. A. Mitchell and numerous assistants were on hand to answer questions and take orders. A view of this exhibit is shown in Fig. 7.

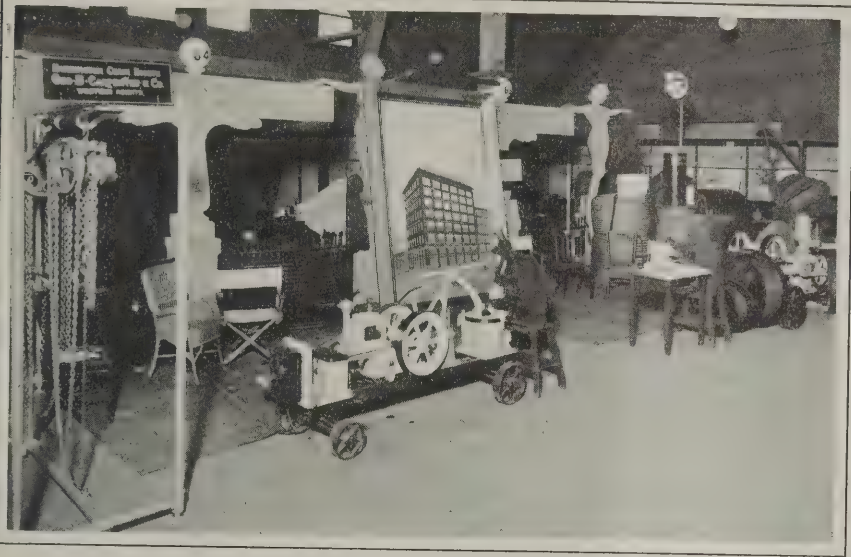


Fig. 6—A Display of Hoisting Apparatus and Builders' and Contractors' Supplies

"The 'Big-an-Litle' concrete mixer is the biggest and best small mixer on earth. Don't hesitate to ask questions about it," was the greeting General Manager G. Jaeger of the Jaeger Machine Co., Columbus, Ohio, extended to visitors interested in concrete mixers. Mr. Jaeger exercised authority over five booths in which "Big-an-Litle" mixers were featured, while in the annex a type of new tile machine, making tile with a rectangular cross section by hydraulic pressure was to be seen. The popularity of this mixer was apparent by the large crowd always in attendance witnessing "mix-a-minute" demonstrations. An event in connection with this exhibit was the making of a real film for the Pathè weekly moving pictures. The title role was acted by Mr. Jaeger.

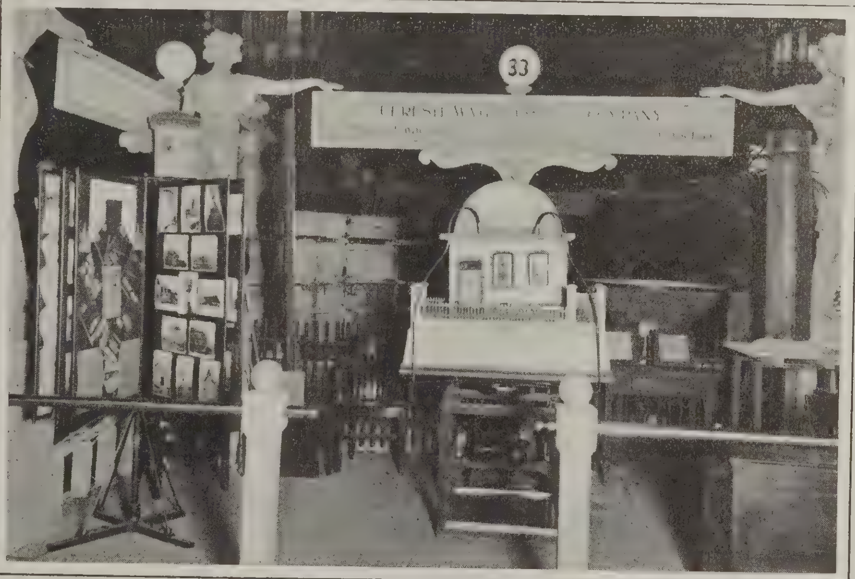


Fig. 7—The Waterproofing Features of "Ceresit" Shown by Model of a Small House

Exhibits at the Chicago Cement Show

The J. B. Foote Foundry Co., Fredericktown, Ohio, manufacturer of cement block machines, cement brick machines, silo block machines, cap and sill machines, concrete mixers, etc., maintained an interesting exhibit of its concrete machinery that was of an appealing character to contractors who were looking for efficient mixers producing a uniform and well-mixed concrete.

High grade concrete machinery, one especially for contractors' use on account of its large batch, constituted part of the display of the Ideal Concrete Machinery Co., Cincinnati, Ohio. Among the exhibits was a combined concrete brick machine and tamper. This company is producing various types of concrete mixers, and announcement is made that its cube mixer's capacity has been built recently to accommodate five cubic feet instead of four as formerly.

A compact machine, simple in operation and guaranteed to operate at low cost, while at the same time being especially adapted for use in connection with concrete mixers, were some of the points brought in the investigation of the "Ideal" engine, displayed by the Original Gas Engine Co., Lansing, Mich. In the company's improved "Ideal" hopper-cooled, frost-proof engine, the old machine has been re-designed, keeping its old points and including a light enclosed crank case, automatic oiling new valve mechanism and jump spark ignition. Everything has been made interchangeable so that the parts may be easily replaced. The company manufactures also gasoline-driven contractors' machinery such as hoists, mud pumps, centrifugal pumping and sawing outfits.

A low-down force-feed concrete mixer of recognized reliability, small, compact and simple in operation, featured the booth of the Elite Manufacturing Company, Ashland, Ohio. General manager, P. E. Countryman, and M. A. McEntire explained that the feed on this mixer is a radical departure from the usual design of continuous concrete mixers. Instead of the ordinary intermittent feeding device that depends on gravity, a system of chain elevators is used to force the materials into the mixing trough in an even, continuous and unbroken stream, furnishing a concrete of uniform and even texture. It was also explained that these mixers are built with two different styles of hoppers one with the short elevator, and one of greater length, hinged, enabling the elevator to be folded for moving from one job to another.

The Davis Acetylene Co., Elkhart, Ind., exhibited one of its "Haas" fence post molds, the features of which were explained by Peter Haas, the inventor. The machines are made of steel throughout, and the products are made by the slush or poured process. The No. 8 machine is recommended more especially on account of its ability to make eight posts at one time, or four corner posts. This machine's capacity appeals strongly to the farmer, who, in slack times, can make enough posts to assure permanent fences for many years' use. In operation the machine is simple. Catalogs giving full details as to capacity, strength, durability and adaptability were distributed by Richard Wilson, office manager of the company.

Several types of portable saw rigs constituted a most attractive and diversified display in the booth of the C. H. & E. Manufacturing Co., Milwaukee, Wis. Five of these contractors' equipments were advantageously shown, while the executives in charge of the booth also told of the company's other products in the way of builders' hoists, trench pumps, concrete chutes and other well known builders' appliances. For distribution the company issued its house organ, the *Buzzer*, which was brought out the first of the year. The booth was in charge of H. E. Brandecker, vice-president, F. F. Hasa, secretary and treasurer, and A. Nydegger, the company's engineer.

Sasgen Brothers, Chicago, Ill., had the distinction of being the only exhibitors of builders' derricks. The company's "Peerless" circle swing steel derrick is presented to builders as the most convenient for hoisting building material of its kind. It is equipped with self-lubricating bearings, with folding mast and bottom, that can be used by hand, horse or other power.

One of the new companies to exhibit was the Atlas Engineering Co., Milwaukee, Wis., maker of a new concrete mixer. This machine is of the revolving-drum type, chain driven, and is claimed by the makers to deliver 3 cu. ft. of concrete every minute. The mixer is loaded from a hopper having a shut-off gate, so that it can be filled ready for the next batch while one batch is mixing.

Reducing Efficiency of Enclosed Radiators

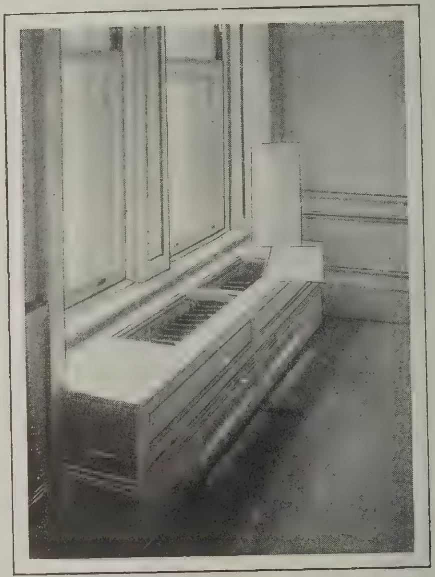
In view of the discussion which appeared in these columns some time ago on the above subject, the comments which follow will not be without interest:

It is bad enough to place a direct radiator behind the shields now frequently used; but it is still worse to enclose it, and one might say ridiculous when it is so enclosed as to provide an inadequate air supply.

In order that my contention may be more readily understood, I present a reproduced photograph of a 6-column 20-section radiator as installed in a large apartment building.

It was, as can be seen from the accompanying illustration, placed in front of a double window in a large room and the selection of a low radiator was made in order to enable the enclosure to serve as a window seat. I estimate the radiator exposed about 140 sq. ft. of surface, and taking the air, as it must, from the room at a temperature of possibly 60 deg., the area of the air inlet to the radiators should have a greater ratio than 1 in. to the square foot of heating surface. In this case two 5 x 26-in. register faces were placed in the face of the casing, as shown. When I allow 50 per cent. of the area of the faces as effective free area through which air may enter I feel that I am dealing generously with the fretwork face, and as there were two of them on this basis, there were 130 sq. in. of inlet area or less than 1 in. to 1 sq. ft. of surface exposed in the radiator.

The outlet at the top consisted of two faces 13 x 26 in. and on the same basis of calculation there would be 338 sq. in. of outlet for the warm air. In passing over a steam radiator, air would not expand to such an extent. Possibly it is expected that the air cooled by the glass will drop down to the radiator. This question of the effectiveness of enclosed radiators, the amount of air supply which should be provided to them and the location of the inlet of this air supply may have received consideration at the hands of experts, but surely the rank and file of heating contractors are somewhat in a fog as to these several very important points.



Reducing Efficiency of Enclosed Radiators

In my opinion where a radiator is enclosed in this way, the fretwork face plate should have at least 50 per cent. more free area in square inches than the radiator exposes surface in square feet. If the outlet for the air circulating over the radiator is 50 per cent. more than the inlet, it will facilitate the circulation and enable the radiator to do more effective work than if the air space is reduced. If there are other people with experience who can be induced to express their views on the point which I have raised, I feel sure that many in the heating business would be glad to know their ideas on enclosed radiators.

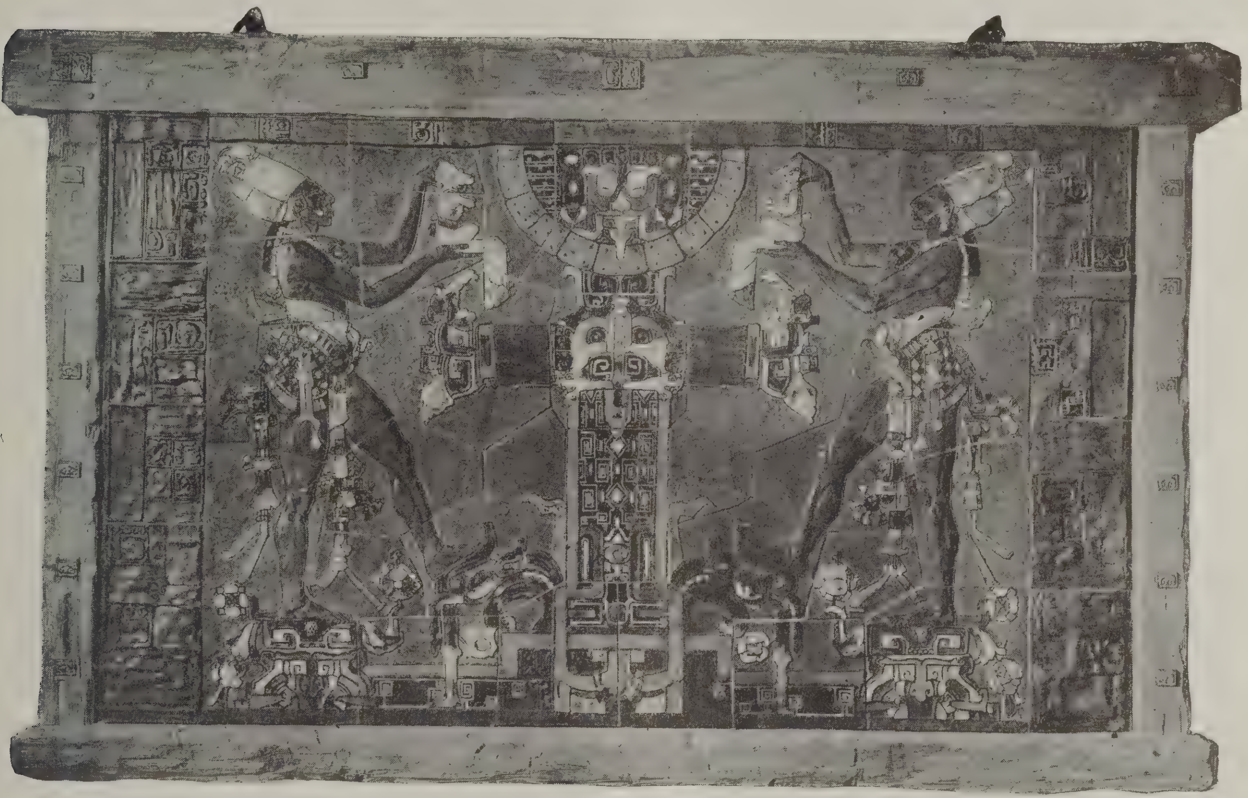
A Bas-Relief in Enameled Tiles

"The Pageant of the Sun God," as Shown at the Recent Exhibition of the Architectural League of New York

WRITING about the lack of color in modern architecture, Charles De Kay, the noted art critic, of New York, alludes to the bas-relief in enameled tiles at the recent exhibition of the Architectural League of New York. "Notwithstanding all that has been done in the way of tiles to decorate the interior and exterior, the fact remains that our architects are not taking the advantage they might of this material to enrich the townscape and provide sumptuous and lasting color schemes for churches and capitols, hotels and libraries, railroad stations, public and private houses.

"The color notes from smooth or dull or unevenly surfaced product of the kiln have been so far mild enough, discreet enough, well enough suited to the timidity one meets when the question of color comes up. Even these anemic hues are often set aside for drab or dead white walls, unrelieved by anything save windows in monotonous rows whose deadly iteration numbs the mind and steeps the soul in gloom. By the deft introduction of tiles in smooth or dull glazes much might be done to render tall buildings less repellent, and to some degree disguise the enforced but ghastly regularity of their fenestration.

"There are, however, bolder workers in the field for urban architecture. At the exhibition of the Architectural League, one of the best in recent years, glazes were shown of great promise in a great mural panel, or tablet, not composed of small cubes like mosaic, nor of tiles in formal squares, but of irregular pieces of faience. The effect of the joining suggests the so-called Cyclopean masonry of the early Greek period. The theme chosen was that of Cacique priests in adoration of their gods. Worship of the old gods of Incas, Mayas, and other culture-tribes of South and Central America and Mexico may well be taken for compositions of great boldness and beauty, and particularly are they suited to titles in relief. We have here the beginning of a national style of decoration for large buildings.



A Bas-Relif in Enameled Tiles at the Recent Exhibition of the Architectural League of New York—Made by the American Encaustic Tiling Co.

"Unlike much of the tile work made today, this design was carried out in singularly rich and harmonious tones. The artist has been inspired by that strong feeling for simple broad color masses found in decorations that survive from the pagan past, but found also in textile and fictile work of modern Indians.

"Now the atmosphere of our cities charged with chemicals, works banefully on ordinary pigments, but tiles with a well baked body and firm glaze withstand these acids as they do heat and cold, sunlight and frost. They give the least possible lodgment to the grime that floats in the air.

"Tiling can be varied in tint to prevent a too solid color, it can be modeled in relief to obtain effects of shade. Chance alterations in tone, or 'hazards' of the kiln allow the architect a gamut of color vibrations on which to play the changes. Such examples of tile work are of happy augury, for they must mean that architects can obtain soft or bold effects of color if they want them. Perhaps through this material we shall have presently an architecture better suited to our brilliant atmosphere, our autumn woodlands, than the doleful kind we inherit from Europe. In the hands of architects who have some feeling for color we should have rich and varied decorations for school house and city hall, hospital and public library, clubhouse and theater, market and museum. We should demand to be at least as favored in this way as were the men of the Middle Ages and the ancients of Greece, Assyria and Egypt when they built their temples and palaces."

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Electric Lighting at Panama Exposition

The electric lighting and power systems of the Panama-Pacific International Exposition will include some conspicuous features. Chief among these will be the system of illumination, which will be almost revolutionary in its character, containing at least eighteen details that will be adopted at this exposition for the first time in the history of decorative electrical illumination.

Instead of following the old custom of outlining the various palaces and other architectural structures by means of incandescent lamps, the entire facade of each building and tower will be flooded by means of screened luminous arcs and hidden batteries of searchlights. Instead of presenting an array of white lights, the system will present a brilliant, but not dazzling, illumination in all colors of the solar spectrum, the light emanating not from within but from without.

The various parts of the towers will be picked out by means of imitation "jewels," as they are called, which are cut-glass gems of the highest grade, the facets being all tin-polished, and the "jewels" being of assorted colors, to secure this result. They will be placed in such manner as to dangle easily under the influence of the breezes, which will cause them to scintilate in the sun's rays by day and in artificial beams by night. By means of electric searchlights projected upon them they will exhibit all the primary colors at night, ever scintilating.

◆

Interstate Tile Manufacturers Convention

During the progress of the Chicago Cement Show the Interstate Cement Tile Manufacturers Association held its annual convention at the Auditorium Hotel. Three daily sessions were held from February 17 to 19, and the proceedings consisted chiefly of reading papers relative to concrete tile and pipe, while several interesting papers were illustrated.

At the opening session, with the disposition of routine business, A. D. Miller, Goshen, Ind., read a paper entitled "The Business End of Tile Manufacture." This was followed by "Construction of Concrete Pipe Lines," by Arthur S. Bent, of the A. S. Bent Construction Co., Los Angeles, Cal., and read by A. B. Jones in the absence of the author.

The Wednesday morning meeting was a joint session with the American Concrete Institute. Two illustrated lectures were scheduled, "The Effect of Alkali Water on Cement Tile," by Rudolph J. Wig, Associate Engineer Physicist, Bureau of Standards, Washington, D. C., and "The Layout of Concrete Products Plants," by E. S. Hanson, editor of the *Cement Era*. George P. Diekmann, chief chemist for the N. W. States Portland Cement Co., Mason City, Ia., was also programmed for "Some Tests on Plain and Reinforced Pipe," and A. Marston, dean of the Division of Engineering, Iowa State College, for "Standard Specifications for Drain Tile."

The annual dinner was held in the hotel on the evening of the 18th at 6.30 o'clock, Ernest McCullough officiating as toastmaster.

At the final gathering two papers were presented, the first by W. B. Dunning, assistant engineer of the Universal Portland Cement Co., being entitled "Concrete Sewer Pipe," the other entitled "Concrete Sewer Pipe Machines: A Symposium" was an illustrated talk on the points of many machines on the market.

The meeting closed with the disposal of routine business and the election of the following officers:

President	B. Blair of Woodstock, Can.
First Vice-Pres.	J. J. Hammen of Spencer, Ia.
Sec.-Treas.	E. S. Hanson of Chicago, Ill.

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Bound Volumes of "Building Age," for 1913

We desire to call the attention of those readers who desire to secure them, that bound volumes of *The Building Age* for 1913 can now be obtained through the Technical Book Department connected with this journal. The binding is in heavy boards with gilt side and back titles, and the volumes contain all reading pages. The price is $2.50.

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The Forest Products Exposition

With the approach of the Forest Products Exposition, which is to be given at the Coliseum, Chicago, Ill., from April 30 to May 9, and in the Grand Central Palace, New York City, from May 21 to May 30, indications point to one of the most important, popular, attractive and result-producing industrial expositions ever held in America. Reports and reservations of space from every section of the country and branch of the industry bear out the report of the management, that every phase and part of the American wood industry will be well represented and forming the great shop window of the industry, which is the fundamental purpose and ambition of the undertaking.

During the past few weeks some of the most important details of active participation have been decided upon definitely. Contracts have been let by the principal lumber manufacturing associations for their respective exhibits of the utility, possibilities and general advantages of their particular productions, while individual exhibitors are engaged in more or less elaborate preparations. At recent meetings several branches of the hardwood manufacturing industry appointed committees with power to act toward representation; at the annual meeting of the Hardwood Manufacturers' Association of the United States the tight stave manufacturers took steps to co-operate with the slack stave manufacturers, the oak manufacturers decided on a definite plan to exhibit, the yellow poplar manufacturers decided to secure representation, and several other branches of the hardwood industry took up the matter with definite purpose. At the same time the American Wood Preservers' Association, at its meeting in New Orleans, appointed a committee with power to act, and space was secured at both Chicago and New York for an extended display, while the committee was authorized to undertake to secure joint display with the paving block manufacturers.

Among other reservations that have been decided upon are E. C. Atkins & Co., Clyde Iron Works, Barrett Manufacturing Co., Seattle Cedar Lumber Manufacturing Co., Mossman Wood Turning Co. and a number of others, while more than fifty individual manufacturers, producers, specialty concerns and organizations have practically closed for their representation. The space has been allotted for the forestry division of the United States Department of Agriculture for an extensive and most comprehensive demonstrating exhibit of the operations of this service in research and testing.

"With the general attractiveness and pronounced interest and educational importance represented in the Forest Products Exposition," said Manager George S. Wood, on returning to Chicago from attendance at a number of important conventions of various branches of the wood industry, "the attendance at Chicago and New York will be of great result-producing value. The ultimate consumer is naturally the contingent aimed at in such an undertaking, and it is a matter of conjecture how this same ultimate consumer can escape the effectiveness and lasting impression of such a profoundly interesting and instructive exhibit. Our efforts to produce something that will demonstrate not only the well-known, but entirely new, details and elements of the advantages, value and permanency of wood as a commodity are resulting in an arrangement and visualization that will tell a new story to those in the industry, while creating a lasting and convincing impression on the general public. There is no doubt of the great misunderstanding and misconception of many of the most important points in the use and possibilities of wood, and while the attendance of representatives of all branches of the industry and those who may reach directly or indirectly is assured, logical arguments are forthcoming to bring the layman to an intimate study of this great industrial lesson. Many are co-operating with the high purpose of advancing the industry largely in mind, while the self-interest of many others determines the advantages and exceptional opportunity to display their wares and transact business as they could by no other means."

The Forest Products Exposition—An Ideal Interior View of the Coliseum at Chicago During the Progress of the Coming Exhibition

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A wig maker in Nice, France, sued the proprietor of the finest and largest hotel in the town on the ground that his light had been spoiled by the hight of the hotel, as it had been erected too near his place of business. He claimed that he required a very strong light to properly conduct his trade and the hotel prevented this. The extraordinary thing is that judgment was given in his favor by the local tribunal and the hotel proprietor ordered to take down the building.

The Making of Wooden Stave Columns

Details of Constructive Methods of Column Making From the Rough Lumber to the Finished Product

WHEN the Greeks originated the Corinthian, Doric, Ionic, and other types of column architecture, which in later years were more commonly used by the Romans, it is doubtful whether these masters anticipated that their designs would be copied and their models duplicated in wood by people living thousands of years after them. Yet such are the conditions of the present day, and the makers of wooden columns throughout the country are constructing their products along the architectural lines of the ancient Greeks, while introducing into their several important processes of manufacture varied features of constructive durability. One of the oldest makers of wooden columns in the country—the American Column Company, Battle Creek, Mich.—has an up-to-date plant for its patent "Stay-Locked" columns, some of the details of making which are here given, together with numerous pictures showing the columns in different stages of their development. In Fig. 1 the effect produced by the use of these columns as part of a pergola is clearly shown in front of the company's office, which, while a separate building, yet directly communicates with the main plant.

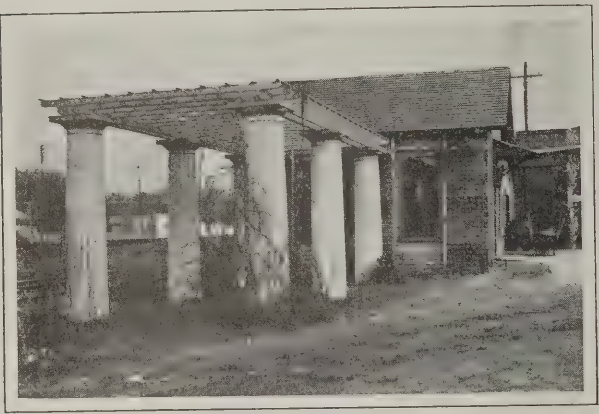


Fig. 1—Use of the Stave Columns in Pergola Construction

In the manufacture of wooden columns for exterior and interior decoration, the former are invariably made of cypress at this factory, while oak, yellow pine and mahogany may be used for interior work according to demand. The various kinds of lumber arrive at the factory in carload lots, already cut into planks, being brought right up to the receiving department on the railroad tracks that immediately adjoin the plant.

The first process through which the cut lumber passes is drying, the department for this consisting of a room 60 ft. long, 30 ft. wide and approximately 12 ft. high, with trolley tracks running down the center of the floor, the planks being loaded direct from the car. On each side of the tracks the room is divided into three sections, each section having a trolley loaded with wood almost to the height of the ceiling. These kilns are of the specially made slow-drying variety, and for thoroughly drying the lumber an average temperature of 100 deg. is maintained throughout the period, which is usually from one week to ten days. The tracks in the drying department extend outside of the room for several feet into a storage room, so that when the wood is dry enough the trolleys are wheeled outside of the kilns. On reaching the storage room the trolleys are not unloaded, but are shunted down a small incline where they remain until the lumber is used. By this time the planks are ready for planing and for sawing into staves.

All this initial work is conducted on the main floor. When the planks have been carefully planed they are cut into staves of various lengths, according to the column that may be required. The staves average in thickness from 1¼ to 1½ in., their width being anywhere from 2¼ to 2¾ in. When the staves are cut they are loaded on to wooden trucks and wheeled to the freight elevator, where they are carried to the shaping department on the second floor of the building.

The machine used in this connection is shown in Fig. 2 of the illustrations and is known as a stave sticker. This machine is of special design and saves the work of four men. The staves as they arrive on the trucks can be seen at the side of the workman. When the staves are fed into this machine four operations take place. Each side of the stave is corrugated with a double V-joint, the top of the stave is rounded, so that when assembled there is little turning to be done, and the entire stave is also tapered to a required pitch. After the staves pass through the shaper they are ready for the glueing and assembling department, which is immediately adjoining.

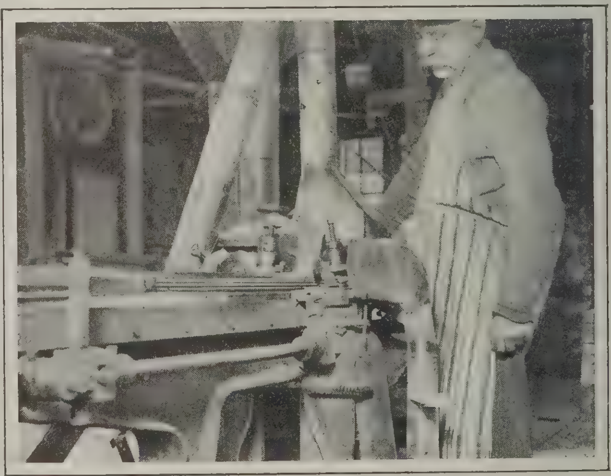
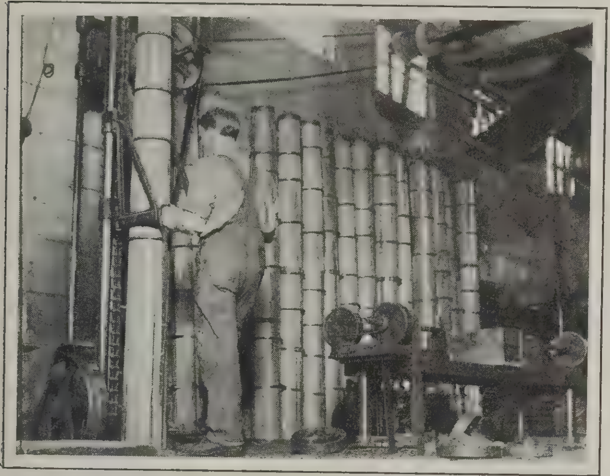


Fig. 2—A Stave Sticking Machine in Operation

In the manufacture of a 10 in. column there are fourteen staves used in its construction. When the staves reach the glueing department the corrugated edges are run several times over a revolving circular brush, then through a bath of waterproofed glue. The staves are then placed in a "form," the corrugated or double V-sides being fitted into one another, making a perfect, waterproofed joint. When the column is half made, that is to say, when half of the staves are glued together, an inside "form" is inserted and the remainder of the column built round it. When the column is completed the inside "form" is removed, and in order to keep the column true to shape and in position rings are placed over the ends. The column is then taken to the clamp driving machine, a view of which is shown in Fig. 3. The column seen in this machine has rings around it of several sizes according to its taper. These rings are driven into place by the side arms or clamps of the machine, which are worked by the operator, the clamps having an up-and-down movement.



The Making of Wooden Stave Columns—Fig. 3—Driving the Clamps in the Columns

The columns are reinforced further by having two or three iron bands placed at various intervals, and are then taken to the stapling machine, shown in Fig. 4 of the pictures. The use of staples in the manufacture of these columns is one of the important parts of their construction, inasmuch as every joint is reinforced at regular intervals from one end of the column to the other. The staples used in this connection are of the strongest cold-rolled steel, each 5/16 in. wide, made in the factory by a special stapling machine.

The staples are driven at intervals averaging from eight to ten inches throughout the length of the column, so that in a column of 10 in. diameter no less than one hundred staples would be used. The stapling machine holds about 160 of these staples, so that, generally speaking, the machine has to be loaded twice in the stapling of three columns. The staples in the making are strung on steel sticks, and feeding the staples into the stapling machine is quite a simple operation. With the staves securely glued and the joints stapled, the column is made moisture-proof, so that they will not open up under any atmospheric conditions.

In order that the staves may set firmly the columns are left to stand from twelve to twenty-four hours, according to the size of the column. In the illustration of the workman operating the clamping machine in Fig. 3 a number of columns can be seen clamped and setting. Before they are left to set, however, they are placed in a machine known as a straightener, this device being seen to the right of the clamp machine operator in Fig. 3. In the straightener the column revolves and the workman calculates whether the column is true to shape from top to bottom. If the column should not be quite true in certain spots the defective places are marked, and on reaching the turning department the column is made true. After the columns have set for their specified time they are shipped on trolleys to the turning and smoothing department on the first floor. On account of the rounding of the staves in the stave sticker, however, there is little turning to be done, but, nevertheless, each column is well turned and smoothed so as to make it perfectly round from end to end.

In Fig. 5 one of the columns is shown on the turning machine. In the workman's left hand can be seen a block which rests on a guide, the grade of which conforms to the exact taper of the column, thus assuring all columns being turned out exactly alike in shape. After the columns have been turned they are well smoothed and are then ready for the oiling and painting department. The cypress columns are primed with one coat of pure linseed oil, while the columns made of other woods are painted white or any desired color. When the columns are dried after painting they are ready for crating, there being either two, three or four in a box, according to size. The sides and ends of each column are well protected with packing.

In Fig. 6 is shown a broken section of a column, clearly indicating the appearance of the stay-locked joints and the interior reinforcement of the staves.

Throughout the factory there are also several interesting departments for making such accessories as bases and caps, and also departments where such fancy work as fluting is done. The bases and caps are made on the second floor. The bases on which the columns rest are made either round or square, the former being made of six quadrangular pieces of wood, after which the corners are cut off, while the square bases are made in four sections. In making the latter the pieces are placed in a clamp, nailed with cement-coated nails, and the mitered corners reinforced with corner blocks, and finally glued. Corrugated nails are also driven in the top of the

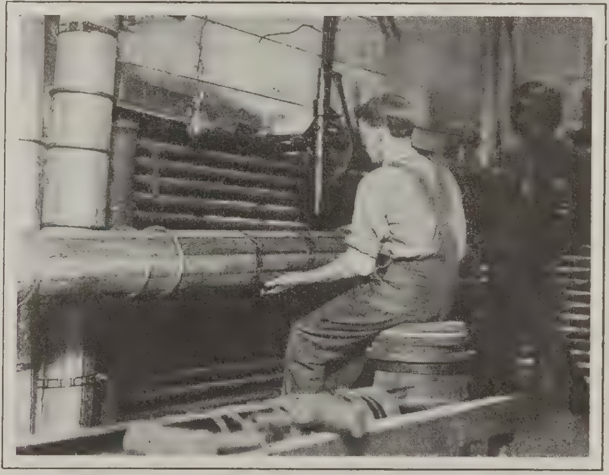
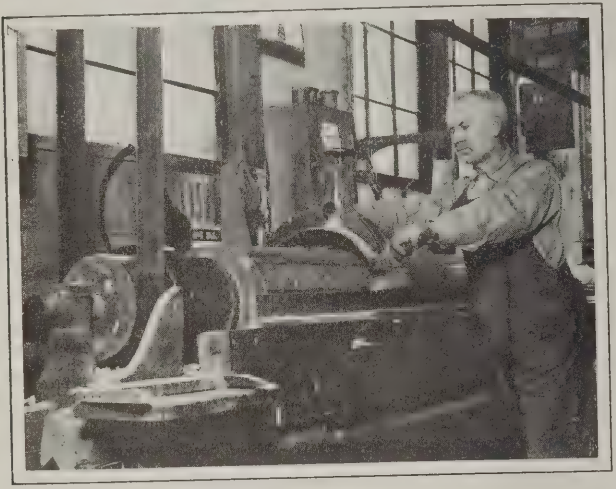


Fig. 4—The Use of Staples is One of the Important Parts of the Construction of the Columns

joints, and in the case of the round bases corrugated nails are driven in the top and bottom, thus preventing any possibility of the corners opening up. A view of one of these bases is shown in Fig. 7 of the illustrations.

The method of forming channels on a column is known as fluting, this work being done on a flute lathe located on the main floor. The column is placed on a traveling support and a blunt tool pressed against it makes an even channel down the length of the column. In a column composed of fourteen staves there would be fourteen flutes, inasmuch as the fluting is done in the center of each stave. The special machinery to do this and other work incidental to the patent construction of these columns is mostly made by the Buss Machine Works of Holland, Mich.


The Making of Wooden Stave Columns—Fig. 5—A Column on the Turning Machine

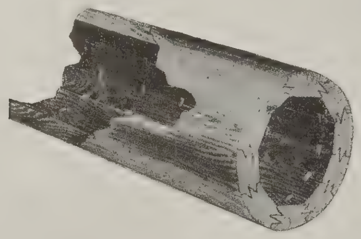


Fig. 6—Broken Section of a Column Showing the Interior Reinforcement as well as the Double V-Joints

In the factory proper there is approximately 30,000 sq. ft. of floor space, taking the several buildings and departments collectively, while the adjoining Warehouse "B" has a floor space of 10,000 sq. ft. This storage department has a capacity for carrying 3,000 finished columns ready for immediate shipment and also carries 2,000 rough shafts.

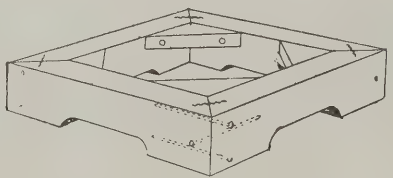


Fig. 7—View Showing Construction of a Base

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On what was formerly the site of the tent city at Rockaway, Long Island, N. Y., there will be erected the coming season 400 bungalows.

Building Operations in Canada in 1913

The figures which are available covering building operations in leading cities of the Dominion of Canada during the year just closed present a most interesting study showing as they do that while unusual activity prevailed in some centers a marked degree of conservatism prevailed in others. The total value of building permits issued last year in 100 cities of Canada was $170,069,838, while the same cities in 1912 showed building improvements to have been projected, involving an outlay of $215,736,477. One of the most notable contrasts is found in the returns for Montreal, where last year building construction to cost $27,032,097 was planned, as against $19,408,690 in the year before. An opposite contrast is found in the case of Calgary, where last year the value of building operations was placed at $8,619,153, as against a total in 1912 of $20,394,220.

The figures covering 25 eastern and 15 western cities of Canada and presented in what follows are taken from *The Builders' Bulletin* of Montreal:

	1913	1912	1911
Toronto	$27,038,624	$27,041,761	$24,374,539
Montreal	27,032,097	19,408,690	14,579,952
Hamilton	5,110,000	5,491,800	4,255,730
Ottawa	3,991,380	3,621,850	2,997,610
Fort William	4,265,715	4,039,600	3,077,860
Maisonneuve	2,454,923	2,685,828	1,195,120
St. John	2,380,660	566,200	572,700
Westmount	2,099,544	1,824,369	1,435,682
Port Arthur	1,935,185	2,494,179	595,180
Quebec	1,929,781	933,002	739,423
Outremont	1,819,000	1,582,000	1,317,700
London	1,789,920	1,136,108	1,038,880
Windsor	1,148,975	988,063	739,615
Brantford	1,015,886	1,157,105	613,860
Halifax	835,850	589,775	508,836
St. Catharines	759,478	811,335	265,435
Kingston	666,474	645,774	314,569
Berlin	647,571	834,213	356,091
Peterborough	488,540	465,905	345,372
Preston	400,055	337,160	244,375
Guelph	357,335	388,499	513,690
Chatham	338,310	201,591	195,147
Stratford	334,085	439,496	103,533
Sydney	321,198	656,111	495,642
Winnipeg	18,621,650	20,563,750	17,716,750
Vancouver	10,248,803	19,420,432	17,652,642
Edmonton	9,242,450	14,446,819	3,672,260
Calgary	8,619,153	20,394,220	12,907,638
Saskatoon	4,453,845	7,640,530	4,960,286
Moose Jaw	4,238,470	5,275,797	2,413,736
Victoria	4,037,992	8,208,155	4,026,315
Regina	4,018,350	8,047,309	5,099,340
Medicine Hat	3,851,572	2,836,219	743,272
Prince Albert	1,380,290	2,042,450	921,959
St. Boniface	1,038,840	1,251,512	1,131,735
New Westminster	958,975	1,634,518	1,124,587
South Vancouver	895,000	2,600,000	....
Lethbridge	504,954	1,358,250	1,033,380
Brandon	603,309	1,166,214	1,538,679

A study of the figures will show the progress which these cities have made in the past three years.

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Building Mechanics' Wages in Alberta

Among the several resolutions adopted by the Builders' Association of Alberta, Canada, at its fourth annual convention, which met at Medicine Hat on March 2 and 3, was one fixing the scale of wages for building mechanics throughout the province as follows:

Trade	Average wage per hour
Plumbers	62½ cents
Tinsmiths	55 cents
Carpenters	50 cents
Bricklayers	70 cents
Plasterers	70 cents
Painters	50 cents
Stonecutters	65 cents
Stonemasons	70 cents
Electricians	62½ cents
Bricklayers' laborers	35 cents
Plasters' laborers	43¾ cents
Lathers	$3.00 per thousand

There were in all some forty odd delegates present at the convention representing builders' organizations of the principal cities and towns.

Wall Boards in Building Construction

Their Use as a Substitute for Lath and Plaster and for Other Purposes—Economy of Application

ONE of the important developments of recent years in connection with the construction, remodeling and repair of moderate cost buildings of various kinds has been the many forms of wall board which are to be found on the market at the present day. These are of such a nature generally speaking as to strongly appeal to the builder, the carpenter-contractor, the architect, and even the owner of a building, by reason of the fact that wall boards are easy and economical of application, permit of ready decorative effects where used for the interior wall surfaces, are light and therefore readily handled, are moisture-resisting and can be employed in connection with entirely new construction work as well as for remodeling interiors in a variety of ways. For cottages, stores, schoolhouses, summer homes, garages, bungalows, chapels, country club houses, etc., wall boards are admirably adapted and are rapidly growing in popularity for the purposes for which they are specially intended. Rooms finished with this material can be made particularly neat and attractive considering the cost involved and permit of what is usually regarded as waste attic space in a house to be converted into habitable apartments, which are more or less in keeping with those upon the floors below. The work involved in connection with the application of wall board can be done during the winter months when trade is slack as well as in the summer season, thus eliminating "dull periods" for the wideawake and progressive carpenter and builder.

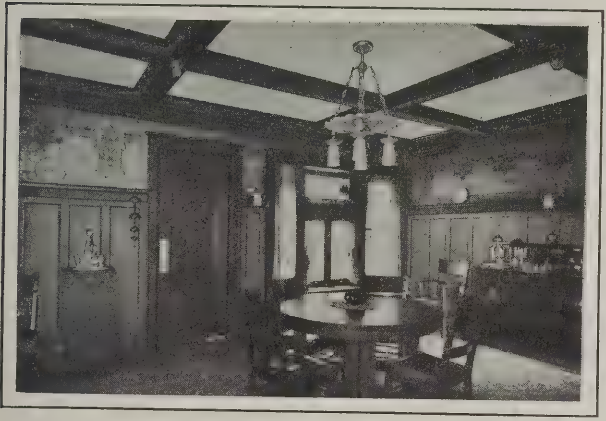


Fig. 1—A Dining Room Treated with "Utility" Wall Board

In the field of substitutes for lath and plaster what is known as Utility wall board enjoys the distinctive feature of being composed of five layers of a high grade fibre board which is said to lessen the tendency to contraction and expansion. These layers are cemented together with pure asphalt under intense heat and roller pressure, which makes the board moisture-proof within. The five-ply board is then surfaced on both sides with a moisture-proof coating applied under such intense heat that it thoroughly impregnates the outer surface of the board, rendering it impervious to moisture. The board is made in sheets of varying lengths and widths and may readily be cut with a saw and tacked directly to studding and joists with hammer and nails. The ease and rapidity with which it can be nailed and applied is an important factor, while another is the elimination of the usual dirt and confusion incident to lath and plaster.

The joints may be covered with decorative wood strips, thus securing a variety of pleasing and artistic panel effects, while arched, beamed or flat ceilings offer a wide scope to artistic originality. An excellent example of the effects produced by the use of Utility wall board is seen in the dining room interior, Fig. 1. Walls may be coated with burlap, flat tint paints or with Alabastine wall tints, in plain or pebbled effects. The five-ply feature of the Utility wall board is pointed out by the Heppes Company, the manufacturers, Chicago, Ill., as a comparatively recent innovation. The economy of the board is found in its ease of application and its durability, for the first cost is said to be the whole cost, as once applied it does not crack, drop off or peel.

Wood fibre wall boards season and toughen with age; paint, decorations and bonding substance tend to render them more durable, just as paint and preservatives render ordinary wood and forest products more lasting. The scientific way in which the fibers are laid and their treatment give wood fibre wall boards, as made by the Beaver Companies, Buffalo, N. Y., a certain advantage over ordinary forest products. They are said not to crack, as they are made from tough selected spruce fibres

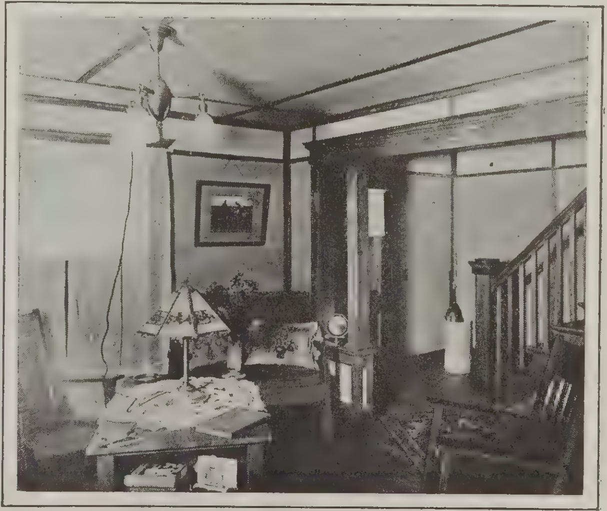
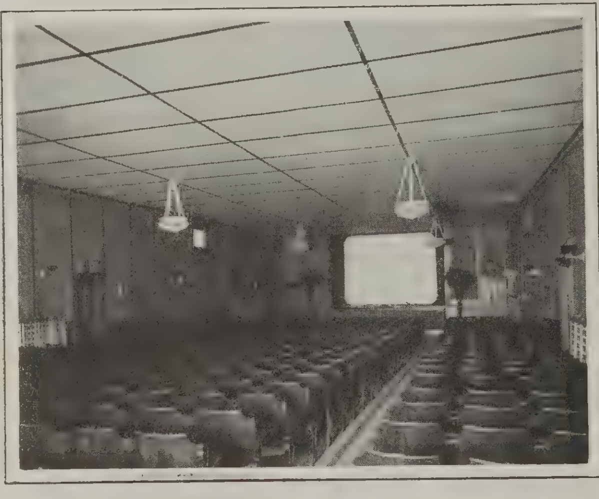


Fig. 2—A Living Room with Walls of "Beaver" Board

which are crossed and re-crossed and then bonded by wood preservative. The dead air spaces formed are thus sealed, making the panels non-conductive of heat and cold and at the same time sound-retarding. They also have certain acoustic advantages so that a wall built of them is said to be superior for office and public buildings. The bonding substance is germicide, and as the panels are made in one piece and run to the floor there is no surface upon which household pests can commence operations. The finished decorative wall may readily be washed if desired and walls built of a good wood fibre board are therefore particularly desirable for hospitals and schools as well as for homes. The wall boards are made in convenient sized panels from 2 to 4 ft. in width up to 16 ft. in length, which the carpenter can readily apply.

The application and decoration of a good wall board, particularly one offering a pebbled mat surface, is a simple matter. The rooms so finished may be occupied at least within a few days after the work is done and public buildings such as schools and hotels have been remodeled or completed and *suites* of office rooms entirely changed without interfering with the regular routine business. In Fig. 2 we show the appearance of a living room looking toward the stair hall and showing wall and ceiling treatment. For the builder there is a certain economy in using wall boards, as they permit him to keep the entire job under his direct supervision. Where wall board is used changes may be made at slight cost, as any trouble with the wiring or the plumbing of the house may be traced and all that is necessary is to remove a few panels, make the repairs and replace the boards.

Another excellent example of the effects produced by the use of wall board is represented in Fig. 3, which shows the interior of a new moving picture theatre at Tonawanda, N. Y., the walls and ceiling of which are covered with Plastergon wall board. This material has as a distinctive feature the treatment of the wood fibre in order to protect it against the action of the weather. The treatment is with chemicals which render the board moisture-resisting and the expansion and contraction of the panels are reduced to a minimum, while eliminating warping and twisting. These qualities of the board render it particularly adaptable for use in those sections where the humidity is great. It is put up in panels, the sizes of which depend upon requirements.



Wall Boards in Building Construction. Fig. 3—Interior of a Moving Picture Theatre with Walls and Ceiling of "Plastergon" Wall Board

It is easily applied in new construction by nailing the panels direct to the studding or joists and it can also be applied on old walls or ceilings without removing the lath or plaster. After it is applied it is painted with either oil or water colors, depending on conditions. The walls are treated in wainscot and frieze design and ceilings may be beamed or plain, arched or flat. This material, which has been placed on the market by the Plastergon Wall Board Company, Tonawanda, N. Y., can be used to great advantage in remodeling dining rooms, libraries or dens, also in transforming an unused attic into comfortable living rooms, a cozy den or sewing room. Some of its special applications are for partitions for lavatories, offices or rest rooms in public buildings or factories. It is also advantageously used in the construction of telephone booths, backings for store windows, fruit cabinets, trunk trays, etc.

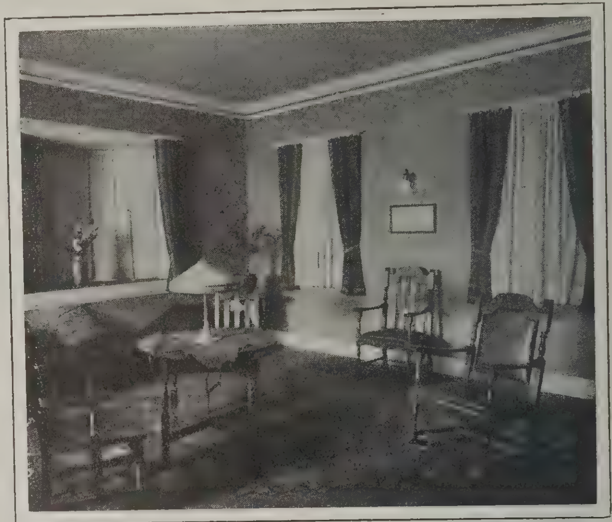


Fig. 4—Living Room Showing Effects that May Be Obtained Where "Compo-Board" Is Used

Another material which has many uses in the home, the factory, etc., is Compo-Board, which differs in many ways from the ordinary substitute for lath and plaster and which, as its name implies, is a "composition" board. It has three principal parts—its surface of heavy papers, the wooded core made up of a series of slats placed indiscriminately as to the grain so as to prevent warping, and the cement which binds the parts together. After being assembled the whole is subjected to heavy pressure and intense heat, producing a smooth, straight sheet of unusual strength. It is made in sheets 4 ft. wide, ¼ of an inch thick and ranging in length from 1 to 18 ft. In Fig. 4 we show the interior of a living room where the Compo-Board has been used. The point is made that the material is air-tight, rendering the rooms warmer in winter and cooler in summer; is moisture-proof, which tends to keep the rooms dry, sanitary and healthy. It is also fire-resisting; will not chip and mar, and is very durable. Accordiing to the Northwestern Compo-Board Company, Minneapolis, Minn., the material is nailed directly to the studding, and the entire job can be done by the carpenter in less than one-third the time it takes to lath and plaster. Old plastered rooms can be made new and attractive by the use of the board, and it is utilized to a large extent as a lining for summer cottages, while an old barn or out-building can be remodeled into a garage, gymnasium, workshop or study, according to preference.

Wall Boards in Building Construction. Fig. 5—Interior of an Exhibition Booth Constructed of "Ideal" Wall Board

In these days of manufacturer's exhibits, industrial expositions, trade displays in connection with annual conventions, county and state fairs, etc., there is a positive demand for a material to be used in the construction of decorative exhibition booths that will be at once economical, easy to erect and remove, capable of lending itself to many diverse methods of treatment and adornment and in large degree offering resistance to fire. Wall board has been found unusually well adapted for this purpose and the Roberds Mfg. Company, Marion, Ind., has made a specialty of furnishing its Ideal wall board for this purpose. The extremely stiff and rigid character of the new sheets of board renders them especially satisfactory for uses of the booth builder. The sheets are now made with four layers of the well-known Roberds wood pulp fibre board cemented together under great pressure by means of three layers of a special adhesive asphalt binder, thus making every sheet of the finished board seven-ply in thickness and correspondingly strong. The effect produced by the use of this board in connection with an exhibition booth is clearly indicated in Fig. 5, which represents the interior of a display booth at a recent Household Show held in the Coliseum at Chicago. This wall board can be cut into sections of any size and shape by means of an ordinary hand saw. It is so rigid in character that very little frame work is necessary to make the booth complete. Decorative effects are readily secured by tasteful coloring and paneling of the board, thus giving the semblance of permanent construction rather than that of only temporary utility.

A comparatively new wall board possessing several distinctive features and which is of great tensile strength is the J-M Wall Board made by the H. W. Johns-Manville Company, Madison Avenue and Forty-first Street, New York City. This great strength of board is due to three things. In the first place it is composed of closely interwoven wood fibre from virgin Wisconsin forests and there are no chips or by-products in its make-up. In the second place the fibre is treated to a toughening process and in the third place it is made in laminated form, several layers of the wood fibre being joined as inseparably as though welded, thus forming a sheet that is practically a solid homogeneous mass. On account of its toughness and durability this wall board is said to neither crack, peel, nor scale, and that it can be sawed without leaving rough edges. Another point which the builder and houseowner will appreciate is the possibility for securing artistic effects. There is an economy in the amount of paint required to secure a thorough coating and the finished side of the wall board having a slightly pebbled surface gives a rich decorative effect when paint is applied. Another feature is its ability to resist moisture. By a secret method of handling and treating the fibre, the interior of the board—the seat of possible warping—is rendered practically impregnable to outside elements. This board has a wide and varied range of application, being appropriate for cottages, suburban dwellings, bungalows, farm houses, club houses, hospitals, office buildings, etc. In applying it is nailed directly over the studs and joists, care, of course, being exercised to have all surfaces uniform.

Still another wall board in which the enterprising builder as well as the carpenter and houseowner is likely to be interested is composed of four panels of what is known as chip board held in bond by Gilsonite asphalt cement. This four-ply board is 3/16 in. thick and is said to be the only one that has three layers of mineral asphalt cement to insure against the penetration of moisture. The chip board used is of the very highest quality, which gives to the finished product a high tensile strength. It is known as Ceil Board, and can be had in several different finishes, including plain gray, tan, golden and Mission quartered oak, circassian walnut and waterproof Ceil board. All these boards are of the same basic construction, the plain gray and the tan as well as the grained boards, being sized on both surfaces to prevent the absorption of moisture. The grained boards are faithful reproductions of the grain of the wood represented. The process applies the graining to the surface of the board and becomes an integral part of it. The plain boards are used to take the place of lath and plaster, while the wood grained boards are popular as a substitute for solid wood or veneers for wainscoting or other interior paneling, window backs, case panels, etc. The waterproof board is much used for sheathing, siding and roofing of small buildings, as well

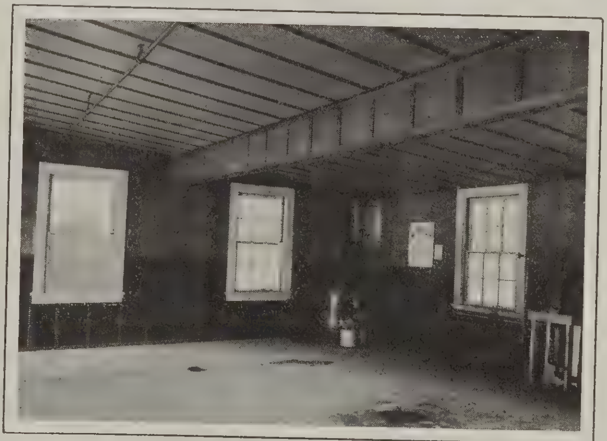


Fig. 6—A Garage Having Walls and Sides of "Ceil-Board"

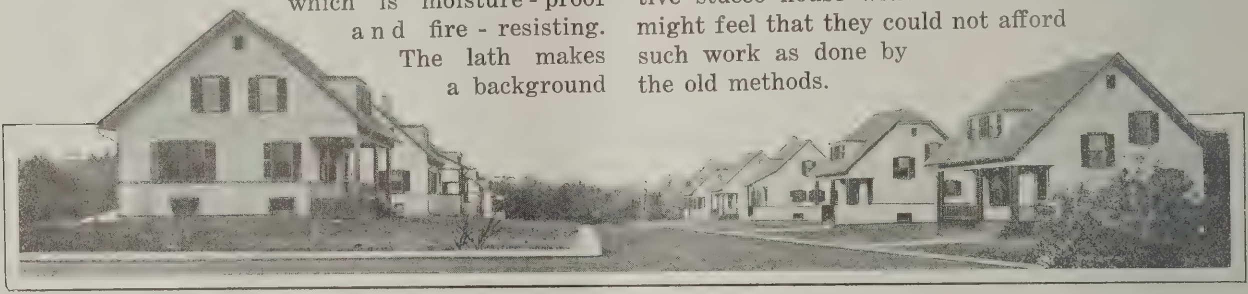
as for the interior lining of rooms where there is likelihood of contact with steam or other vapors. These wall boards are made by the Philip Carey Company, Cincinnati, Ohio, and in Fig. 6 we show the interior of a garage in which plain tan Ceil board is used for the ceiling, the waterproof board as a wainscoting and the quartered oak board from the top of the wainscoting to the ceiling and along the girder extending across the building.

In the picture, Fig. 7, which appears on this page, there is presented several of a group of 30 houses in the construction of which Bishopric stucco or plaster board has been extensively used. On the exterior of the houses, which, by the way, are intended for occupancy by industrial workers, this wall board was used with dovetail construction, whereon stucco was applied, while for the interior the plaster was put on with the dovetail lath applied to the studding and then the smooth surface was decorated. The board is intended to take the place of wood sheathing, building paper and metal lath on the exterior of a house and on the interior it is a substitute for metal or wood lath.

This stucco or plaster board is made of patented, keyed lath imbedded in toughened asphalt-mastic which is moisture-proof and fire-resisting. The lath makes a background that is very rigid, hence it cannot sag and walls and ceilings constructed of it are light and yet substantial as there is a great saving of plaster as compared with the old method of interior plastering. Another point is that as the board comes in sheets 4 ft. square ready for use and as it is simply necessary to nail the stucco board to the bare studding, the walls are immediately ready for the cement or plaster.

The point is made that a building involving this construction is much warmer than would otherwise be the case and that a saving of at least 25 per cent in the amount of cement stucco used is effected. Another point emphasized by the Mastic Wall Board & Roofing Company, 376 Este Avenue, Cincinnati, Ohio, makers of this product, is that a building may be completed in very much less time than where other material is used, as the moment the wall board is applied to the exterior it is warm and dry and the interior finish may be commenced just as soon as the exterior of the frame of the house is covered. The stucco may be put on immediately therefater or later, according to preference.

As the material is economical as regards cost and results accomplished it tends to bring the distinctive stucco house within the reach of many who might feel that they could not afford such work as done by the old methods.



WALL BOARDS IN BUILDING CONSTRUCTION. FIG. 7—GROUP OF HOUSES IN WHICH BISHOPRIC STUCCO OR PLASTER BOARD WAS USED

Some Live Economies for the Builder

Showing How Trifles May Frequently Be Made to Count in the Management of a Carpenter and Builder's Shop

By G. D. Crain, Jr.

A FRIEND of a famous sculptor visited him upon one occasion and found him apparently finishing a marble statue. A little later he came back and the artist was still at work on the same piece. At a casual glance the visitor saw nothing different about the statue, and upbraided his friend for not having made better use of his time.

"You are mistaken," replied the sculptor. "Since your last visit I have brought out this feature, strengthened this muscle, and given grace to that curve. I have polished that rough surface and added to the facial expression."

"Yes," returned the other, "but these are only trifles."

"Trifles, indeed," was the reply, "but trifles make perfection, and perfection is no trifle."

That story may have only remote application to the building business, and yet it is true without question that the man who pays attention to the little things is he who is going to win. Genius has been defined as an infinite capacity for taking pains, and the latter has its rewards in business as in art.

A carpenter and builder's shop in which the writer spent several hours not long ago was a fine example of the art of attending to little things. There was no big, outstanding feature that made it different from any other shop; and yet the careful, painstaking way in which every detail of the business had been arranged gave it a unity as a whole that could not have been improved upon.

What was the result? In a community where most of those in his line are barely getting along, this man is making money, and is expanding his trade in all directions. With every job he takes he succeeds, and every contract completed usually means a friend for life, and all because he believes in making the little things count.

Take for example the matter of scraps. Everybody tries in a general way to avoid waste, but this carpenter and builder carries out the plan to the last detail. Not a piece is thrown away if it is possible to get anything else out of it. Scraps are carefully retained and sorted, and when a special piece is wanted it can always be found. Turned work is made almost entirely out of short pieces which have fallen from the saws, and little ornamental pieces for grill-work, etc., are invariably built up of scraps. Supports for scantlings, dentils, door-blocks and other pieces requiring only a small amount of material are made up from what would ordinarily be waste, and the result is that the lumber is made to go to the limit.

Use of Old Material

The same idea is carried out with regard to old material. In razing an old building to make way for a new one, or in repairing a house which has been partly destroyed by fire, this carpenter and builder usually manages to secure a lot of pieces which are still good. Then when someone comes along and wants a special job which calls for fair effects, but not too great an outlay, the second-hand lumber can often be utilized to good advantage. In putting up back stairways or railings on back porches, for example, old balustrades can be worked in, and this makes it possible for the stairway, even though inconspicuous, to make a good appearance.

Every bit of the short stuff is piled in racks, material of the same kind being put together. The turned work referred to is also kept separately, and the result is that when a special item is wanted, there is no hunting through a shed full of odd stuff, but the carpenter can lay his hands on it without trouble. And it is mighty helpful to be able to go into the shed and get an odd size without having to cut it out of a fresh board.

The same idea is applied to iron work of all kinds. Window sash weights, air gratings, anchors of various kinds and other odd pieces which naturally accumulate around the shop of the builder are all retained in a small structure especially adapted for the purpose. Racks have been erected in it, and each kind of material has a place to itself. The result again is that there is never any hunting around for stuff—what is to be had is in full view, and it goes without saying that good use is made of it.

The Care of Machinery

The care of machinery is always the unmistakable sign of the good workman. In this case every saw and planer in the shop is given the careful attention which is necessary to keep it working in good condition. Whenever it begins to work loose it is babbitted up, so that the accuracy of the work turned out is not affected. So true do the machines cut, by reason of the care that is given them, that in one emergency case an entire parquetry job, involving the cutting of an immense amount of small stuff to dimension, was gotten out on the regular machines in the shop, and it went down as smoothly as though it had been made by specialists.

Saws and bits are cared for properly, and when not in use are arranged in racks which prevent them from coming in contact with each other. Besides maintaining their condition more easily, the carpenter and builder is never at a loss for a particular piece, but can always lay his hands on it. The bits are kept in small boxes, partitioned off so that each bit fits into its own special place. The cutting edges of these are consequently never injured, as is the case when they are allowed to lie around haphazard.

Here is a little point that some might not think worth mentioning. As a matter of fact, it has proven to be important in preventing the waste of material. Buckets which formerly held paint are retained, and when work is being done on a comparatively small job, not requiring an entire keg of nails, the amount that will be needed is sent out in the small container. Thus there is no danger of the nails being wasted, as is the case when a keg is opened and a plentiful supply suggests carelessness in use. Small boxes which contained locks are also utilized in this way, and the owner of the business said that his nail expense had decreased steadily as the result of the parceling out of the material in smaller portions.

Filing Plans for Future Reference

A little stunt which has been put into use in this shop may be suggestive to others. Every set of plans which has been used in building a house is kept, and is placed in a rack with others of the same season. Thus, if an owner desires to have a building duplicated, it is not necessary to go to the structure and look it over, draughting new plans for the work, but reference can immediately be made to the old ones and the work done accordingly. The racks are dated, the plans for each year going into the place provided for them. A tag is tacked on each, upon which are written the names of the owners for whom the work was done. Plans are retained as far back as 1895. When any information is needed as to a certain building, as in the construction of an addition, there is never any question about it: the plans are gotten out and the exact figures on the job are presented.

"Before we arranged this system of filing them," said the head of the concern, "I must confess that very good care was not taken of them. We did not throw them away, it is true; but they were allowed to lie around without any especial effort being made to systematize the proposition, so that it was a day's labor to secure any particular set of plans that happened to be wanted. Now, however, it is a matter of instant reference, and there is no delay about it. We have saved many a dollar by being able to give immediate information and estimates on putting up a house 'like that of Mr. Jones you built for him four or five years ago,' as the inquirer tells us."

All of this may sound to the hypercritical as going too far with little things. "Penny wise and pound foolish," someone may say. But when it is remembered that the biggest businesses in the world are those which are most careful to stop the tiny leaks, and that the little losses are most dangerous because they are hardest to locate, the advantage of looking after details and economizing at every turn will be realized, and appreciated by every wide awake and up to date carpenter and builder in the country.

Current News of Builders Exchanges

Election of Officers by Various American and Canadian Builders Exchanges—Birmingham Amends Constitution

The Atlanta Builders Exchange

The meeting and luncheon held on the third Thursday of each month is proving very popular and the attendance is constantly growing. Some subject of trade interest is usually discussed, the talks being entirely informal. Every member is invited to attend the meeting and every man pays for his own luncheon, which costs only 50 cents. It is a pleasant and inexpensive way of meeting one's friends in the trade and to talk over matters of mutual interest.

Officers of Canadian Builders Exchanges

At the annual meeting of the Builders' Exchange of Calgary the following officials were chosen for the ensuing year:

President	Charles P. Rutty
First Vice-President	G. Silverster
Second Vice-President	Fred Jones
Third Vice-President	James Marr
Sergeant-at-Arms	P. E. J. Prevel

The Builders' Exchange of St. Catharines recently held its annual meeting at which officers were elected as follows:

President	Charles Chapman
Vice-President	John Davis
Treasurer	William Leach
Secretary	Thomas Mesler

The executive committee includes representatives of the carpentry, masonry, painting, plumbing and electrical trades.

East St. Louis Builders Exchange Elects Officers

The Builders Exchange of East St. Louis, Ill., recently held its annual meeting and elected officers for the ensuing year as follows:

President	George J. Schlosser.
Secretary	E. J. Williams.
Treasurer	Emil B. Keefer.

The reports of the various officials showed the organization to be in a flourishing condition.

Officers of Carpenter Contractors Association

At the annual meeting of the Carpenter Contractors Association of Detroit, Mich., the following officers were elected for the ensuing year:

President	R. G. Simpson.
Vice-President	A. C. Sisman.
Secretary	F. M. Pauli.
Treasurer	James Buchanan.

Annual Meeting of Vancouver Exchange

The members of the Builders Exchange of Vancouver, B. C., recently held the annual meeting when officers for the ensuing year were chosen as follows:

President	J. L. Skene.
First Vice-President	W. M. Horie.
Second Vice-President	T. J. Madlen.
Secretary	H. J. Lindsay.

Reports were submitted by the president and secretary outlining the work since the Builders Exchange was formed and referring to some of that which would be taken up during the ensuing year. It was proposed that joint conferences be held between representatives of the Exchange and the city authorities with a view to securing a revision of the building laws and the question of examining and issuing licenses to building inspectors, superintendents of buildings, etc., will also come up for consideration.

At the first annual banquet of the Exchange held in the Elysium Hotel W. M. Horie, newly elected vice-president, acted as toastmaster. Numerous interesting talks were delivered and the occasion was of a most cordial and interesting nature.

New Officers of Memphis Exchange

The annual meeting of the Builders Exchange of Memphis, Tenn., held at their headquarters in Goodwyn Institute in February developed one of the closest elections in the history of the organization. The final choice was as follows:

President	James E. Faires.
First Vice-President	Walter Hughes.
Second Vice-President	J. Owen Clark.
Treasurer	J. W. Williamson.

The following directors were also elected: Henry Bartl, W. N. Fry, Clarence DeVoy, W. T. Hudson, D. M. Crawford and J. A. Smith. Inspectors of election were Eugene Scott, William Riker and J. W. Garrison.

Officers of London Builders Exchange

At the annual meeting of the Builders Exchange of London, Ontario, Canada, held in January in the rooms of the Association in the Bank of Nova Scotia building, officers for the following year were elected as follows:

President	T. R. Wright.
First Vice-President	E. R. Dennis.
Second Vice-President	A. Nobbs.
Secretary-Treasurer	F. S. Barclay.

It is interesting to note that the year just closed was one of the most successful in the history of the Builders Exchange.

Birmingham Exchange Amends Constitution

At the regular meeting of the Board of Directors of the Builders' Exchange, Birmingham, Ala., held March 16, there was approved an amendment to the constitution relative to candidates for membership in the board and the manner of electing them.

At a recent meeting of the General Building Contractors' Association resolutions were passed in memory of Frank H. Conner, its former president.

Janesville Builders Exchange

The movement looking to the formation of a Builders Exchange in Janesville, Wis., which was referred to in these columns a short time ago, has taken definite shape and a permanent organization has been completed with exhibition rooms in charge of George Davis a feature of the headquarters. When the organization was effected the thirty Janesville contractors who were present were addressed by A. E. Millies, manager of the Builders Permanent Exhibit Rooms in Milwaukee, and by E. C. Schuman, his assistant.

Potomska Mills, New Bedford, Mass.

174 Large Textile Mills

Have during the last four years been equipped with

Burt Ventilators

Here's a picture of one of them—the modern Potomska Mill Building, New Bedford, Mass.

It is equipped with sixty 30" Burt Double Damper Ventilators.

The very best material only is used in their manufacture, the workmen are the most skilled we can get. Constructed on a strictly scientific plan under these conditions—the result is a storm and dust proof ventilator, with the biggest "pull" of any on the market.

What are YOUR Ventilating troubles?

128-page catalogue, showing fine illustrations of mills, factories, shops, foundries and residences where Burt Ventilators are in successful use will be sent if you write for it.

The Burt Manufacturing Co.
312 Main Street, Akron, Ohio
GEO. W. REED & CO., Montreal, Sole Manufacturers of "Burt" Ventilators in Canada

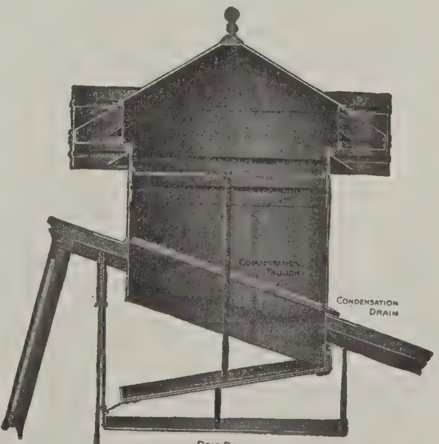


Fig. 1.
Double Damper Ventilator - Open

Burt Double Damper Ventilator especially adapted for Weave Sheds.

YOUR clients will thank you for specifying Kellastone Imperishable Stucco as an exterior covering for their buildings. They'll thank you, not only because of its remarkable beauty and attractive appearance, but because of its lasting, weatherproof qualities. Long after other stuccos have cracked and peeled and crumbled to ruin, your Kellastoned building will remain in all the beauty and attractiveness of the day it was finished—a monument to your judgment and abilities as an architect or builder.

KELLASTONE
IMPERISHABLE STUCCO

contains no Portland cement or lime. It possesses such remarkable tensile strength and adhesive qualities that it will successfully cling to stone, brick or wood.

Kellastone hardens like stone and yet possesses an elasticity that enables it to "give" with the settling of the building to a far greater extent than ordinary stuccos, without cracking, chipping or peeling off.

It is a non-conductor of heat, cold and dampness. It is fireproof and commands a very low rate of insurance. It never requires painting and retains its beauty indefinitely, thus eliminating a definite, annual upkeep expense. Your clients will appreciate these qualities.

Many beautiful and artistic finishes, such as "Splatter Dash," Stipple, Sponge, Pebble-Marble and Crown Point Spar-Dash, can be produced with Kellastone. It can be applied rough cast or smooth finish to new or old buildings. The added beauty and attractiveness it imparts to any building always has a cash value to the owner in increased rentals and selling price.

As an interior finish, Kellastone has no equal. It eliminates those unsightly cracks that are always bound to appear in plastered rooms when the building settles. It can be tinted, stenciled, painted or papered without injury to colors or fabric. For the wainscoting, and in fact the entire surface of kitchen and bath room, Kellastone has no equal. It will resist steam and dampness without the least damage.

Kellastone Composition Flooring

forms a sanitary, serviceable and beautiful floor for Hospitals, Schools, Banks, Hotels, Restaurants, Institutions, Office Buildings and for bath rooms, kitchens, etc., in private homes. It is waterproof, fireproof and abrasion proof.

The fact that many of the most representative lumber and building material dealers in every part of the country are contracting for the exclusive sale of Kellastone in their respective cities is, in itself, ample proof of its quality and popularity.

You, as an architect or contractor, owe it to yourself and your clients to become thoroughly acquainted with Kellastone. We have a new catalog that graphically describes its beauties and merits. May we send you a copy?

The National Kellastone Co., Dept. 6, 19 S. La Salle St., Chicago, Ill.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

The Steven's Line Level

A convenient little device which cannot fail to be highly appreciated by all mechanics having occasion to do work where a level is required is that which we illustrate in Fig. 1. It is known as the Steven's Line Level and consists of an accurate proved level glass placed in a 3 in. aluminum tube with "Spring German Silver" end pieces and hooks formed from one piece of metal. These end pieces are attached to the tube by German silver rivets passing through it and through lugs at the top and bottom between the hooks and the center of the level, thus preventing the hooks from pulling out of alignment in case of rough usage or undue strain. The level weighs only ½ oz., and takes up about the same space as a fountain pen if carried in the pocket. The device takes the place of a straight edge and level and is said to do the work more accurately. For carpentry work, for laying brick and cement walls, for grading of all kinds and for almost as many uses as those of the old style wood level, the little device here shown will be found both convenient and reliable. It is made by Frank B. Hall, Newton Falls, Ohio, who points out that by placing the level on the line at the center where the deflection is equal toward both ends, the end points can be brought absolutely level regardless of how taut the line may be pulled. This method we understand is advocated in laying out foundations, proving walls and in fact on all work where great accuracy is desired.

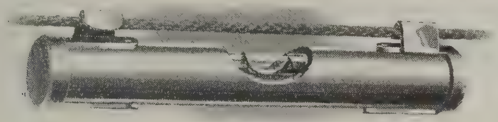


Fig. 1—The Steven's Line Level

Casters for All Purposes

We have just received from Hammacher, Schlemmer & Co., Fourth Avenue and 13th Street, New York City, a copy of Catalogue No. 493 entitled "Casters for all Purposes." The 38 pages of which the work consists, each 9 x 12 in. in size, illustrate 24 distinct styles of casters with all the varying modifications. Prominent among them are casters for beds, chairs, dressers, and general furniture, also for pianos, trucks and for every conceivable use. In connection with the illustrations descriptive matter is given together with numbers, dimensions, prices, etc., etc. An alphabetical index greatly facilitates reference. The company calls attention to the fact that in addition to casters it carries a very extensive line of general hardware, tools and supplies. In hinges and butts, locks, knobs, pulls, escutcheons, catches and kindred items, the company aims to keep all the staple patterns. It also carries in stock all the standard brands of sand and emery paper and cloth, glue, files, rasps, reamers, dies, imported French band saws, bolts, nuts, screws, washers, nails, etc.

Cement Fence Posts

Some rather interesting comments on the history of concrete construction are found in the pages of a pamphlet entitled "Cement Fence Posts and Their Utility," issued by the Davis Acetylene Company, 180 Crawford Street, Elkhart, Ind. It is issued primarily for the purpose of illustrating and describing Haas post machines, reinforcements and other accessories, and accompanying the descriptive text are illustrations of the machine in question and some of the styles of concrete fence which can be produced by means of the Haas machine. The posts and beams turned out by means of it are adapted for use on the farm, in parks and cemeteries and public and private grounds where a permanent and ornamental fence is desirable; for the vineyard, for the trellis, for hitching posts and for clothes line posts. Many of the half tone engravings presented show some of the many uses to which the posts and fences are peculiarly adapted.

The Stanley Doweling Jig

A tool specially designed to enable the user to bore dowel holes in the edge, end or surface of work with ease and accuracy has just been placed upon the market by the Stanley Rule & Level Company, New Britain, Conn., and in Fig. 2 of the engravings we present a general view of it. The slide "E" carries the steel guide "F," by means of which the bit can be brought to the required distance from the edge of the work. The guide is held in the slide by means of the screw clamp and thumb nut "H." The statement is made that the tool will take any thickness of material up to 3 in. and that it is an excellent bit guide for mortising. The company recommends the use of drill bits in connection with the jig as there will then be no danger of boring out of line even in cross-grain wood or through knots. Excellent work, however, it is stated can be done with the ordinary worm bits if care is taken to see that they fit closely in the guides. With the jig five steel guides 1¼ in. long are furnished.

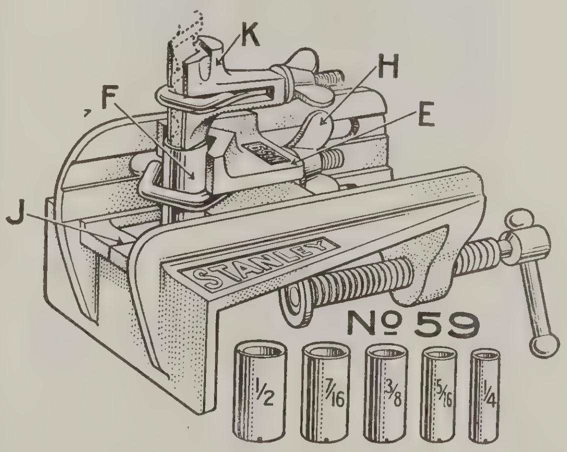


Fig. 2—The Stanley Doweling Jig

In laying out the work the first step is to mark across the edge of the stock the desired location of the dowel hole from the end of the work. Having decided upon this distance the bit guide is placed in the slide, bringing the two marks on the lower edge of the guide the same distance from the end of the jig as the center of the dowel hole is to be from the surface of the work. The under side of the jig is graduated for this purpose. Next the jig is placed on the work bringing the mark "J" on the front of the tool so that it is in line with the mark on the edge of the stock. The depth gauge "K" is furnished which can be used with or without the jig. Where used without the jig the gauge should be set with the large end towards the point of the bit, but in using the gauge with the jig it should be set with the small end down as shown in the cut. The jig is made entirely of metal and all parts are nickel plated.

Something Novel in Door Construction

A form of door construction embodying more than the average number of features of interest to the architect, the builder and the owner, is that which we illustrate in the accompanying engravings. It is a hollow sanitary door manufactured under the process invented by W. L. Evans. An idea of the appearance of one of these finished doors may be gathered from Fig. 3, while the construction involved may be seen from the horizontal cross section of the door shown in Fig. 4 of the engravings. It will be noted that the door has several air spaces separated by ribs while the exposed surfaces are of veneer, the wood and finish being of a kind to correspond to the trim of the room in which the door is to be used. The air spaces allow the core to contract and expand without distorting the door, the strips forming the core cannot push each other and thereby subject the glue joint to excessive strain, this being one reason why the veneers always stay tight. All the material previous to using is first kiln dried and then shrunk in a special machine. The work is put together under a powerful hydraulic press especially made for the purpose. The glue is thus forced into the wood and extended from the pores of one veneer to the pores of the other, thus securely holding every part. These sanitary doors are made in different woods according to requirements and made in any size or thickness. The standard door is 1¾ in. thick and is the same price as 1⅜ in. doors. The thicker door weighs only ½ a pound more per square foot than the thinner one and gives more dead air spaces to break up the sound waves.

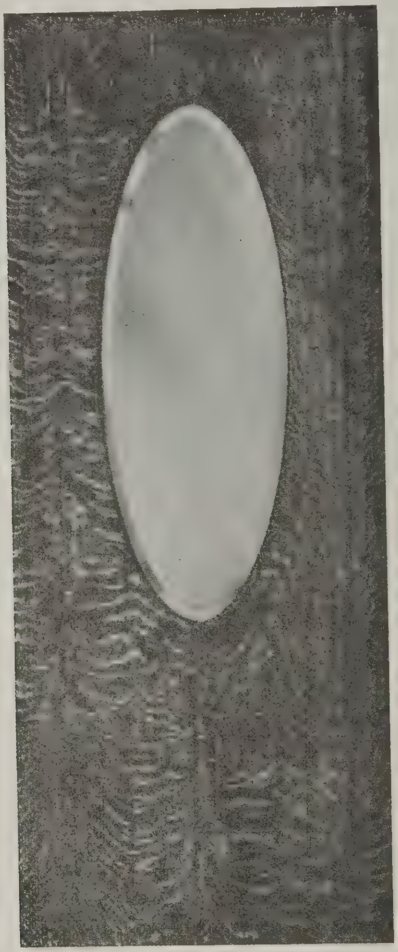


Fig. 3—Elevation of a Quartered Oak Door Made by What is Known as the Evans Process

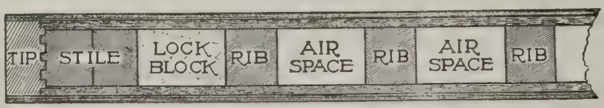


Fig. 4—Cross-Section of Door Showing Construction

These sanitary doors are turned out by the Carnahan Mfg. Company, Loogootee, Ind., which also makes use of the Evans ring joint in the construction of various forms of woodwork, such for example as doors wainscoting, furniture, panel jambs, friezes and soffits, stair panels and in fact anything having a joint of the nature indicated. In putting the work together a corrugated tempered steel ring is expanded over a steel cone until it forms a true circle and at the same time is put into place under great pressure giving the results shown in Figs. 5 and 6 which are merely examples. Each joint requires a corrugated ring clamp for the reason that the ring is left on the work, thus exerting a constant pressure on the joint, which pressure is stronger than the wood fibre. The corrugated tempered steel ring is said to always exert a tendency to assume its corrugated form thereby in case of shrinkage decreasing the diameter of the ring. With the Evans ring joint the pressure is said to be sufficient to take up any variation caused by shrinkage, thus keeping the joint perfect, while the more the wood swells the tighter the joint becomes. Fig. 5 shows a three-corner piece such as might be used in the frames of screen doors and windows, doors with ceiling panels, gates or frames that require great strength. The point is made that frame work made with joints of this kind cannot sag nor can the joints open. In case a joint is desired where the metal ring is not exposed the groove can be quickly filled with a wooden ring which the Evans ring joint machine makes automatically and pushes firmly down flush with the surface of the wood. In Fig. 6 is shown the adaptability of the Evans ring joint for angle panels such as are often used on stairways and special work. A joint of this shape it is claimed can be made for very much less than what it would cost with dowels or with mortise and tenon. When the pieces are placed at right angles to each other it makes such a joint as is used for wainscoting, doors, panel jambs, furniture, etc. The Carnahan Mfg. Company has issued interesting catalogues setting forth at great length the merits of this work and carrying illustrations of some of the many handsome designs of doors manufactured as well as of the multiplicity of joints which are possible by means of the Evans process.

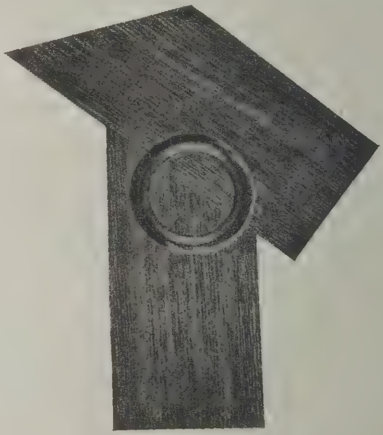


Fig. 6—Ring Joint Where Pieces Are at an Oblique Angle

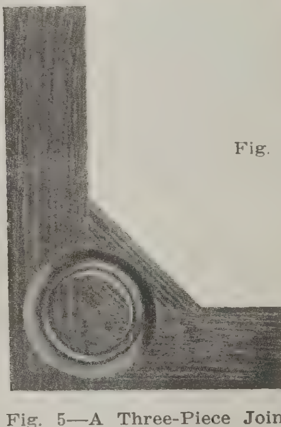


Fig. 5—A Three-Piece Joint of Ring Construction

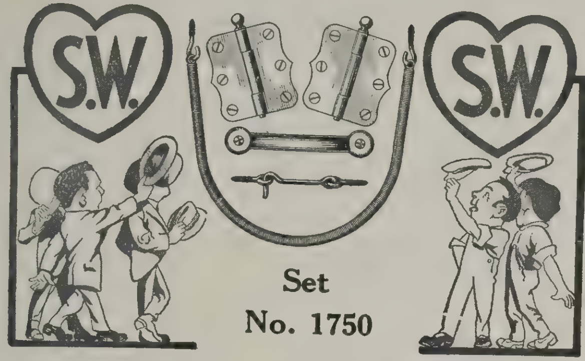
Something Novel in Door Construction—Various Interesting Details

Catalogue of Mechanics Tools

A catalogue which cannot fail to interest mechanics of all kinds engaged in the building industry, consisting as it does of 174 pages of matter profusely illustrated and bound in paper covers, is that which has just been issued from the press by the Millers Falls Company, Millers Falls, Mass., and with warehouse and export

(*Continued on page 92*)

STANLEY'S
Wrought Steel Screen Door Hardware



Each Set Complete with Screws Ready to go on the Screen Door

Owners and Builders alike are pleased with the high quality of the hardware and the convenient way it is packed ready for use.

Butts, pull, spring, hook and eye, and screws, all of the highest quality of material and workmanship.

They can be furnished in Japan, Antique Copper, Brass, or the "Stanley" Sherardized rust-proof finish, the proper finish for outside doors. **The doors are removable in fall by merely slipping out the pins and are as readily rehung in spring.**

Write us for Circular "E"—it tells the story.

THE STANLEY WORKS
New York New Britain, Conn. Chicago

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895

TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

It takes more than good looks to make good roofing

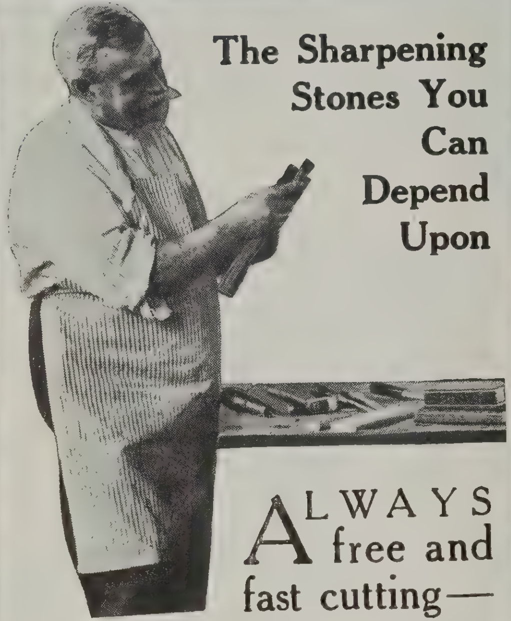
Some roofings that look good wear bad. Be sure of the waterproofing if you want roofing that lasts.

Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

is a lasting resister of sun, wind, rain, snow, heat, cold, alkalis, acids and fire. This genuine *natural* asphalt from Trinidad Lake keeps Genasco full of life and vigor, and it doesn't crack or leak.

Ask your dealer for Genasco. Smooth or mineral surface. Several weights. The Kant-Leak Kleet makes seams watertight without cement—packed in rolls of Genasco smooth surface roofing. Look for the trademark. Write us for the Good Roof Guide Book and samples, Free.

The Barber Asphalt Paving Company
Largest producers in the world of asphalt and ready roofing
Philadelphia
New York San Francisco
Chicago



The Sharpening Stones You Can Depend Upon

ALWAYS free and fast cutting—uniform in their texture, holding their shape, and showing almost as long a life as your tools.

CARBORUNDUM Sharpening Stones

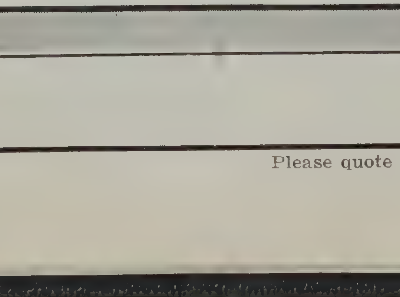
Have earned a place in the tool kits and on the work benches of users of edge tools everywhere.

There is nothing harder, sharper, or faster cutting than Carborundum.

There is a Carborundum Stone for Every Sharpening Job.

FROM YOUR HARDWARE DEALER OR DIRECT

The Carborundum Company
Niagara Falls, N. Y.



sales office at 28 Warren Street, New York City. The work is known as "Catalogue No. 34" and bears date of March 2, 1914. Among the early pages is a list of 33 new tools that have been placed on the market in the last 18 months, many of these having distinctive features likely to interest the carpenter and the builder. These include ratchet braces, sill borers, hand and breast drills in profusion, a boring machine, bit gauge, hack saw frames, tool holder, glass cutter, and extension bit holder. In connection with the multiplicity of illustrations there are given brief descriptive particulars covering the salient features together with the numbers by which the goods are readily identified, also prices. An interesting feature is found in connection with each new design which has been brought out within the time above specified. It consists of the words "new tool" which are placed between two stars and immediately opposite the tool to which it relates. The printing is in bold face type so that in running over the pages even hastily the eye will readily catch the new goods. We understand that a copy of this catalogue will be sent to any reader of *The Building Age* who may be sufficiently interested to make application for it.

The Smith "Mascot" Concrete Mixer

A new type of concrete mixer and one which will appeal to the small building contractor by reason of its light weight, extreme portability, easily operated loader, ground level charging skip of steel construction and a 4 ft. mixed batch, is the Smith "Mascot" illustrated in Fig. 7 and made by the T. L. Smith Company, Thirty-second Street, Milwaukee, Wis. One of the strong features of this little machine is that a great deal of weight necessary in the larger machine is eliminated in the removal of the swinging frame, main and edge rollers, etc. This small drum is simply swung between the two trunions, being pivoted slightly below the center so as to permit of a quick, easy tilting action which gives the machine a fast, even discharge. Another strong point is the fact that the drum ring and driving pinions are totally enclosed in a dust-proof casing. This is filled with grease which is constantly forced outward by the action of the gears and in this way effectually prevents any dust from entering. The picture which we present herewith shows the Smith "Mascot" mixer mounted on a truck with gasoline engine, power charger and tank and with the skip in discharging position. The charging level is only 10½ in. above the ground and the action of the loader is steady and even. The drum is perfectly balanced, tilting with very little effort and the flow of concrete can be regulated to a nicety by simply changing the angle

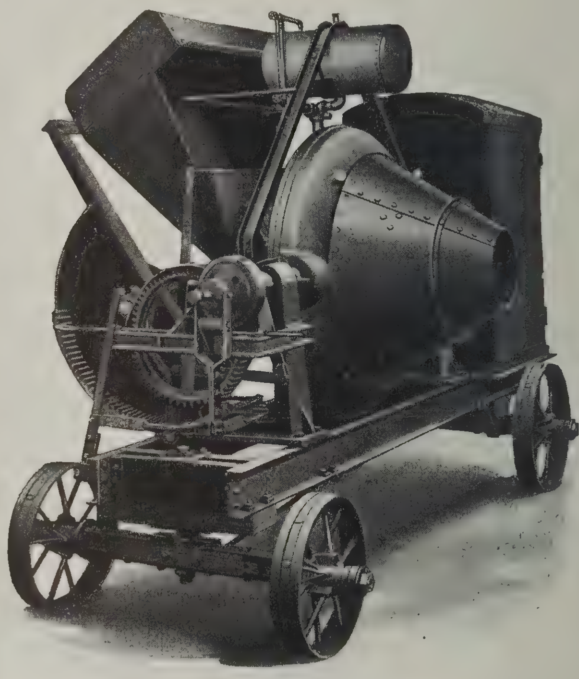


Fig. 7—General View of the Smith "Mascot" Concrete Mixer

(*Continued on page 94*)

EVANS RING JOINT—PATENTED
SHOWING REVERSE SIDE THEY CANNOT OPEN

OUR EQUIPMENT WILL SAVE YOU MONEY

INDIANA OAK OR ANY WOOD SPECIFIED

WRITE FOR CATALOG "GET INTO THE RING"
it tells about this Joint that has four tons elastic pressure

Carnahan Manufacturing Company

211 Mill St., Loogootee, Indiana

Mill Work Specialists

We make Evans Process Sanitary Doors

Standard Veneered Doors

Stock Doors

Doors to Detail

Interior Trim

Stairs

Exterior Mill Work

Oak-Beach and Ash Flooring Thick or Thin

Our stock is large giving prompt service

Catalog 110 of Standard Doors and Mill Work

Finish Assembled with Evans Ring Joints

Sanitary and Standard Doors always in stock

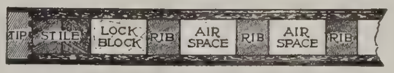
Estimates made from lists or complete plans accompanied with details

High Grade Artistic Product

We claim the largest and best equipped plant in Indiana for special mill work

Catalog 111 of Evans Hollow Sanitary Door

EVANS PROCESS—PATENTED



Made with 1/8 inch Veneers
THEY NEVER GO WRONG

The Evans Hollow Sanitary Door will not shrink or swell in length or breath, it will not warp or cup. 1 3/4 inch doors weigh but 3 1/2 lbs. per square foot, or one-half of a solid door. One man can hang it, this saves 3 cents per square foot labor. The veneers stay tight. It is sold under 1 year guarantee. It is as sound proof as a hollow partition. Evans Ring Joint for mitered casings and miters of all kinds. It is also used for square joints. Panel work and entire sets of casings can be put together with this joint. The rings are made of corrugated tempered steel and forced over a cone until they form a true circle and are pushed into the groove with heavy pressure. Joints held in this way can never open.

WRITE FOR CATALOGS AND PRICES

WE HAVE A PLANT FAR AHEAD OF THE TIMES

When you specify paint think of this—
How will this job look three years from now?

Two houses were completed about the same time, three years ago. But today there is a great difference. Smith, the contractor of the one house, thought mostly of price when he specified the paint. But Jones considered quality and durability. He specified

Lowe Brothers High Standard LIQUID·PAINT

Which kind of a reputation is the paint you specify bringing *you*—the Smith kind or the Jones kind—and which kind of *service* is it giving your customer? It's a serious thing to *think* about.

"High Standard" Paint has the *quality* that *insures* best results. It holds its color, withstands the elements, fails only by gradual wear and leaves a good surface for repainting.

Write for our booklet—"Paint and Painting," full of the kind of information you want about paint.

Look for this "Little Blue Flag"—your guarantee of quality

The Lowe Brothers Co.
518 E. Third St., Dayton, Ohio
Boston Jersey City Chicago
Kansas City Minneapolis
Lowe Brothers, Ltd., Toronto, Canada

The Heart of a
Disston Screw Driver

A sectional view shows this, our No. 9 Model, to be the strongest driver of the kind on the market.

A careful examination of this view makes clear the special construction which gives the unusual strength possessed by the No. 9 driver.

The blade itself extends entirely through the handle, where it is secured to a cap by means of a pin. This pin serves the double purpose of holding the cap permanently in place, and preventing the blade from slipping out. At the ferrule end, a rivet, headed on both ends, extends through ferrule, handle and blade. This prevents the blade from turning in the socket.

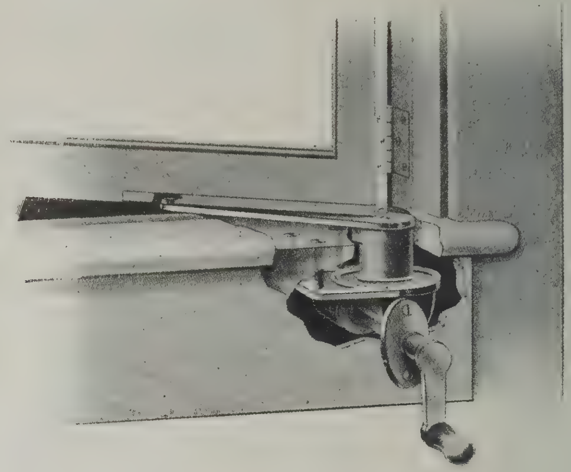
The blade is made from Disston Crucible Steel, and will withstand severe twisting strains when a driver of the proper length to suit the screw is used.

Henry Disston & Sons
Incorporated
Keystone Saw, Tool, Steel and File Works
Philadelphia, U. S. A.

of discharge. The batch as discharged is uniform in mixture and fineness and it is for this reason, says the company, that the "Mascot" is an ideal machine for wheelbarrow distribution. The claim is made that it will take a 4 ft. batch of dry or wet concrete without either splashing or clogging, the duo-cone drum with its sloping ends keeping the aggregate sliding to the center of the mixer. The tilting discharge and scouring action of the back keeps the drum surfaces bright.

Corbin's Concealed Casement Operator

The growing popularity of casement windows in connection with suburban and country houses lends additional interest to the concealed device for operating windows of this kind which has been placed upon the market by P. & F. Corbin, New Britain, Conn., and with New York office at 106 Lafayette Street. The device which is here illustrated permits the opening and closing of casement windows without interfering in any way with window screens or with curtains. It presents no protruding bars or braces, requires no thumb screws to operate it, and is of such a nature as to lock the sash securely at any point from closed to wide open. It is offered as the practical solution of the problem of how to satisfactorily handle casement windows in fine residences "where comfort, quietness and ease of manipulation are desired." In Fig. 8 of the accompanying illustrations we show the casement operator applied to a window, the stool and apron being partially broken away for the purpose of showing the gear case, the pivot bearing and pivot crank. The bolts which hold



Corbin's Concealed Casement Operator—Fig. 8—Showing the Mechanism of the Device

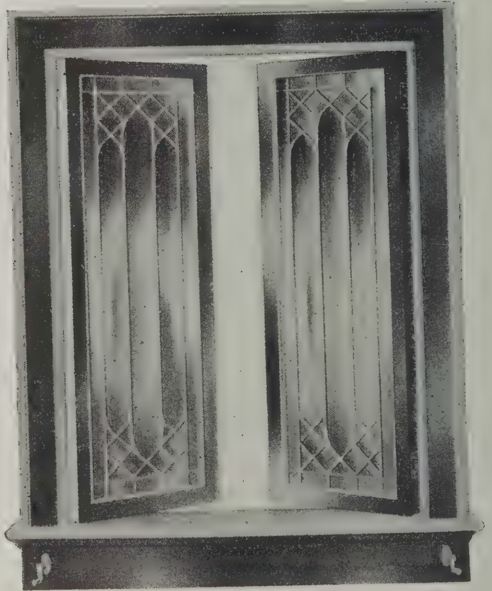


Fig. 9—Appearance of a Pair of Casement Windows Fitted with the Device Here Described

(*Continued on page 96*)

Quick Shipment on Your Spring Screen Order

We make our screens of the very best grade of **Western White Pine** especially kiln dried.

We use three kinds of wire: Black Wire, Standard Twelve Mesh to the inch, Galvanized Wire, and Copper Bronze Screen Cloth, which last is absolutely the **highest grade screen wire cloth** ever manufactured.

We make the lowest prices in America on these quality screens. For we manufacture them in our own modern plant. We load them on the cars which are tracked into the factory. And we get the screens to you safely by fast freight. **Satisfaction and safe delivery guaranteed.**

SCREEN PRICES!! SAVE HALF!!

No. E 301
Screen Doors

Painted Green, 1⅛ inch thick Black Wire Cloth

	Price Each
2-6x6-6	$0.90
2-8x6-8	.94

No. E 306
Screen Door

Made of best Western White Pine. Filled one coat, varnished one coat. Furnished in Bronze, Galvanized or Black Wire cloth. 1⅛ in. thick. Side rails 5½ in. wide.

ft.in.ft.in.	Black Wire	Galv. Wire	Bronze Wire
2- 8x6- 8	$2.00	$2.30	$2.65
2-10x6-10	2.12	2.42	2.77
2- 8x7- 0	2.13	2.43	2.78
3- 0x7- 0	2.20	2.50	2.85

No. E 314
Screen Window

Glass Size	Size of Opening ft. in. ft. in.	Price with Black Wire	Price with Galv. Wire	Price with Copper Bronze
12x20	1 4⅛x3 11¼	$0.53	$0.60	$0.77
12x24	1 4⅛x4 7¼	.59	.63	.83
12x28	1 4⅛x5 3¼	.65	.71	.89
12x30	1 4⅛x5 7¼	.66	.72	.93
14x20	1 6⅛x3 11¼	.59	.65	.80
14x24	1 6⅛x4 7¼	.62	.68	.86
14x28	1 6⅛x5 3¼	.68	.74	.95
16x20	1 8⅛x3 11¼	.62	.68	.86
16x22	1 8⅛x4 3¼	.63	.69	.87
16x24	1 8⅛x4 7¼	.64	.71	.92
16x26	1 8⅛x4 11¼	.65	.72	.93
16x28	1 8⅛x5 3¼	.69	.77	1.01
16x30	1 8⅛x5 7¼	.71	.80	1.04
18x20	1 10⅛x3 11¼	.63	.69	.87
18x24	1 10⅛x4 7¼	.65	.72	.93
18x26	1 10⅛x4 11¼	.68	.75	.99
18x28	1 10⅛x5 3¼	.71	.80	1.04
18x30	1 10⅛x5 7¼	.74	.84	1.11
20x20	2 0⅛x3 11¼	.66	.72	.93
20x22	2 0⅛x4 3¼	.67	.73	.97
and	so on to 44x34			

No. E 315—Screen Windows to Fit 4 and 8 Light Windows

Glass Size	Size of Opening ft.in.ft. in.	Price Black Wire	Price Galvd. Wire	Price Copper Bronze
10x16	2 1x3 3¼	$0.66	$0.72	$0.90
10x18	2 1x3 7¼	.68	.75	.93
10x20	2 1x3 11¼	.69	.75	.96
10x22	2 1x4 3¼	.71	.78	1.02
10x24	2 1x4 7¼	.74	.83	1.07
10x26	2 1x4 11¼	.77	.84	1.11
10x28	2 1x5 3¼	.81	.90	1.17
10x30	2 1x5 7¼	.84	.95	1.25
12x16	2 5x3 3¼	.71	.77	.98
12x18	2 5x3 7¼	.71	.78	.99

No. E 316—Screen Window

Bottom Glass	Top Glass	No. L'ts	Size of Opening ft.in. ft.in.	Price with Black Wire	Price with Galv. Wire	Price with Copper Bronze
40x40	40x14	2	3 8x5 1¼	$1.47	$1.65	$2.16
40x40	40x16	2	3 8x5 3¼	1.48	1.66	2.20
40x44	40x16	2	3 8x5 7¼	1.55	1.75	2.32
44x40	44x16	2	4 0x5 3¼	1.67	1.89	2.49
44x44	44x16	2	4 0x5 7¼	1.74	1.97	2.50
44x46	44x18	2	4 0x5 11¼	1.83	2.07	2.73
44x50	44x18	2	4 0x6 3¼	1.97	2.22	2.91

Write for Grand Catalog—5,000 Bargains Ready to Ship

The secret of our wonderful service for contractors is **5,000 items ready** in our warehouses. They go out in 24 hours after the order reaches us. The qualities are guaranteed far above the standards of any of the associations. We have hundreds of articles usually bought only on special order. **We keep them in stock, supply them quickly, and cut cost of building in half.** WRITE FOR IT.

GORDON-VAN TINE CO.

695 FEDERAL ST. DAVENPORT, IOWA

Straight Talks
on
Durametal Weatherstrips

¶ You contractors—carpenters and building owners—why not buy weatherstrips direct from the manufacturer and do your own installing?

¶ By our unique plan, we have cut out the usual big selling expenses, which enables you to buy direct from us, make a profit on the strip and good money on the installation besides.

¶ Durametal Weatherstrips have been successfully sold for over 10 years, and have stood every possible test. Their durability and simplicity make them superior to all others.

¶ Made of best heavy zinc, and fully guaranteed. Write for samples and prices now before you turn another page. There's money in this for YOU.

A few agencies open to responsible, live, local contractors and carpenters.

Durametal Weatherstrip Co.
825 W. Washington Blvd., CHICAGO, ILL.

This double hung window is equipped with PULLMAN ALL METAL WEATHER STRIP.

It is one of several hundred. The man who had the contract to install the complete order made a profit of a dollar and a quarter on each window.

Here is an opportunity for YOU to get into a profitable business.

The demand has been created. We want live men to sell and install PULLMAN strip. You buy the strip direct from us at FACTORY PRICE, and make the big PROFITS.

Write today for information.

Pullman Metal Weather Strip Co. **York, Pa.**
20 York Street

the gear case in position are also revealed. These pass upward through the wooden sill, and hold the case securely in position under the window sill, where it is entirely enclosed and protected from the weather. The picture also shows the sash plate attached to the bottom of the casement sash, which is broken away to reveal the bronze roller on the end of the pivot crank, which slides easily in a finished slot in the plate as the handle is turned and the sash is opened or closed.

In Fig. 9 we show a pair of casement windows equipped with this concealed casement operator, for it can be used on either right or left hand windows by a simple reversal of parts. It will be seen that the only parts visible are the crank handles and plates, whether the windows be open or closed. These can be finished to match the other hardware of the room. If so desired, the handles can be made detachable, so that only the roses are left visible to the eye. The actuating mechanism in this casement device consists of a worm and gear, greatly multiplying the leverage and enabling even a child to open or close any window without trouble. The window is governed under all conditions by the use of the handle, and cannot be moved except by means of it, as it is securely locked in any position in which it may be placed.

The Van Guilder Partition Machine

One of the latest additions to the line of machines turned out by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y., is the partition machine illustrated in Fig. 10 of the engravings. This is intended for use in the building of thin single walls for partitions and other purposes where the thickness of the double wall is objectionable and where economy of material is desirable, but where insulation is not a consideration. It is obvious that the conditions encountered in this type of wall are entirely different from those of the double wall, but these conditions are claimed to have been met in the machine here illustrated. Referring to the picture, 101 are adjustable and detachable heads; 102 are 5 ft. plates; 103 are 20 in. plates; 104 are corner door plates; 105 a corner door frame; 106 a suspension saddle; 107 suspension rods; 108 suspension hook; 109 suspension chain; 110 is an iron template and the parts marked 111-L and 112-R are connections for turning right and left-hand corners. The letter "A" indicates a temporary plank outside corner; "B" is a temporary plank inside corner; "C" are supports for suspension bar; "D" is a 2 x 4 suspension bar and "E" a door frame. The partition machines are 14 in. high and cinder concrete can be placed in 12 or 14 in. courses without sagging. Working instructions for using this partition machine are given in full in a very interesting publication which the company has issued under the title, "How to Buiid

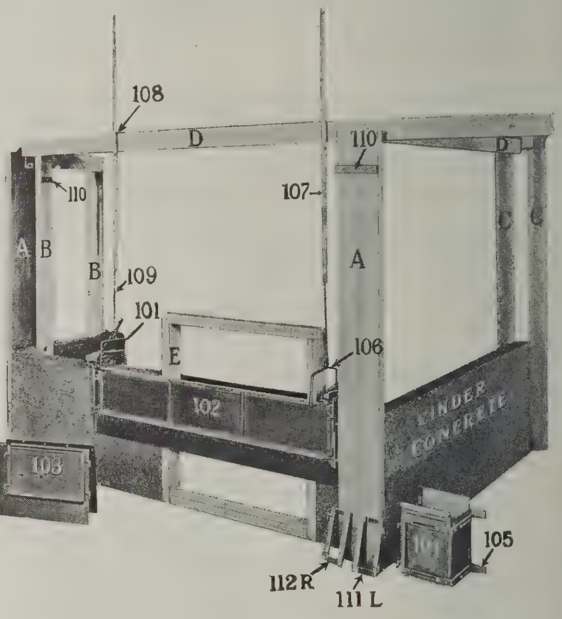


Fig. 10—The Van Guilder Partition Machine

(Continued on page 98)

Safety First

TEST IT

Subject a Corbin front door lock to any test you please and it will meet the requirements, The general strength and solidity; the easy latch bolt action; the quick, snappy response to the turning of the knob or key, and the little muscular effort required to operate; the small resistance in the use of the key, and the absence of sticking or binding; the sinuous key way and its safety against picking tools—all recommend the Corbin lock to architects and contractors who study their clients' interests. Any Corbin dealer will give you full details—or write us.

P. & F. CORBIN

The American Hardware Corporation Successor

NEW BRITAIN, CONNECTICUT

CHICAGO NEW YORK PHILADELPHIA

DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.

TAINTOR'S POSITIVE No. 7
TAINTOR MFG. CO. NEW YORK U.S.A.
Self-adjusting, except turning anvil to change setting

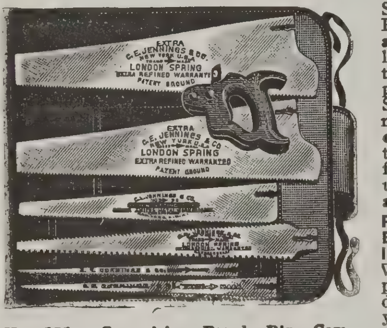
Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.

Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., New York

C. E. Jennings Arrow Head Combination Sets of SAWS
Adjustable Handle



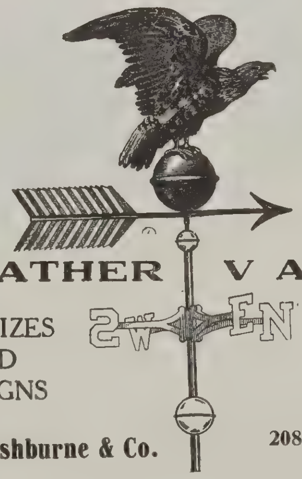
The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set in a Box or Leather Case if So ordered Extra. We will send a set by parcel post if your dealer cannot supply you.

Send for circular.

No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

Sole Manf's
C. E. JENNINGS & CO., 71-73 Murray St., New York



WEATHER VANES

ALL SIZES AND DESIGNS

SEND FOR CATALOGUE

E. G. Washburne & Co.

208 Fulton Street
New York

Something For You

in our Pamphlet 29; viz: Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and a Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

with Van Guilder Hollow Wall Machines." Not only does it give working instructions, but it gives the weight per sq. ft. of cinder concrete partitions of various thicknesses, also the cost per square foot for materials and labor. The illustrations include many half tones showing how the hollow wall machines of the company are operated, a special chapter being devoted to silo construction, water tanks, etc.

The Hess Sanitary Medicine Cabinet

One of the important sanitary accessories of the modern home, the apartment house and the hotel is the medicine cabinet which is customarily found in the bath room. It is the receptacle for more or less of the family medicines, dental preparations, etc., and it is fitting and proper therefore that it should be of such construction as to prove in every way satisfactory for the purpose. One of the latest candidates for popular favor in this line is the Hess steel medicine cabinet or bath room locker, one style of which we illustrate in Fig. 11 of the engravings. It is neat and cleanly; is made of soft, smooth, annealed steel, pressed and formed into shape by powerful automatic machinery. It is constructed in a substantial manner, the corners of the doors and frames being solidly welded and the various parts securely riveted or welded together. It is heavily coated inside and out with snow white enamel, each coat being subjected to a separate baking in gas heated ovens. The point is made that the construction is such that the cabinet never warps, shrinks, swells, sags, nor opens in the joints. It is non-absorbent and will not stain as is frequently the case with wood. It may be washed and cleaned with soap and water or with furniture polish and then wiped dry after each cleaning. The door recesses into a rabbetted jamb so that it is flush with the face of the cabinet. It is furnished with a plate glass mirror with beveled edges or the glass may be plain if preferred. Another style has white doors with no mirror. Still another style when so ordered has the doors with clear plate glass through which the contents of the cabinet may be seen. The cabinet presented in the picture herewith is designed as Style "E" and has an open shelf below. In this case the cabinet is recessed into the wall, although they are made in the same style to be attached to the face of the wall. The hinges and turnhandle are of solid bronze, polished and nickel plated and are attached with plated brass bolts. The shelves are adjustable and may be placed at different hights to suit the requirements.

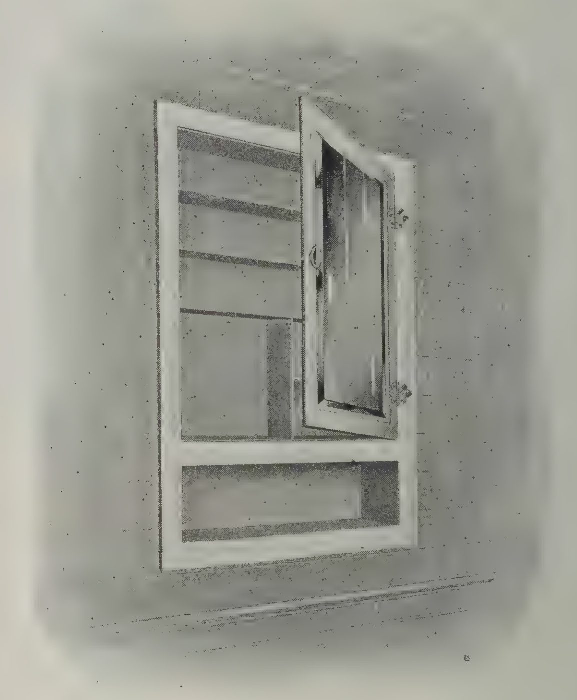


Fig. 11—The Hess Sanitary Medicine Cabinet

When not specified the shelves are of white enameled steel but polished plate glass shelves can be supplied

(*Continued on page* 100)

HERE IT IS!

AN ADJUSTABLE (Jorgensen Patent) HAND SCREW

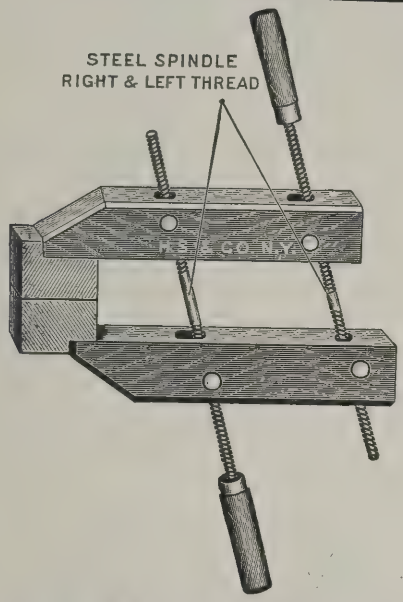
LOOK AT THE PICTURE!

The steel spindles work in steel sockets that permit of swivel movement while the jaws are ***absolutely*** rigid when tightened.

There are almost hundreds of positions possible, making the Jorgensen Screw superior to the old style by this immense advantage.

Send for Special Circular No. 3154 and be convinced

HAMMACHER, SCHLEMMER & CO.
HARDWARE, TOOLS AND SUPPLIES
New York, Since 1848
4th Ave. and 13th St.



SARGENT

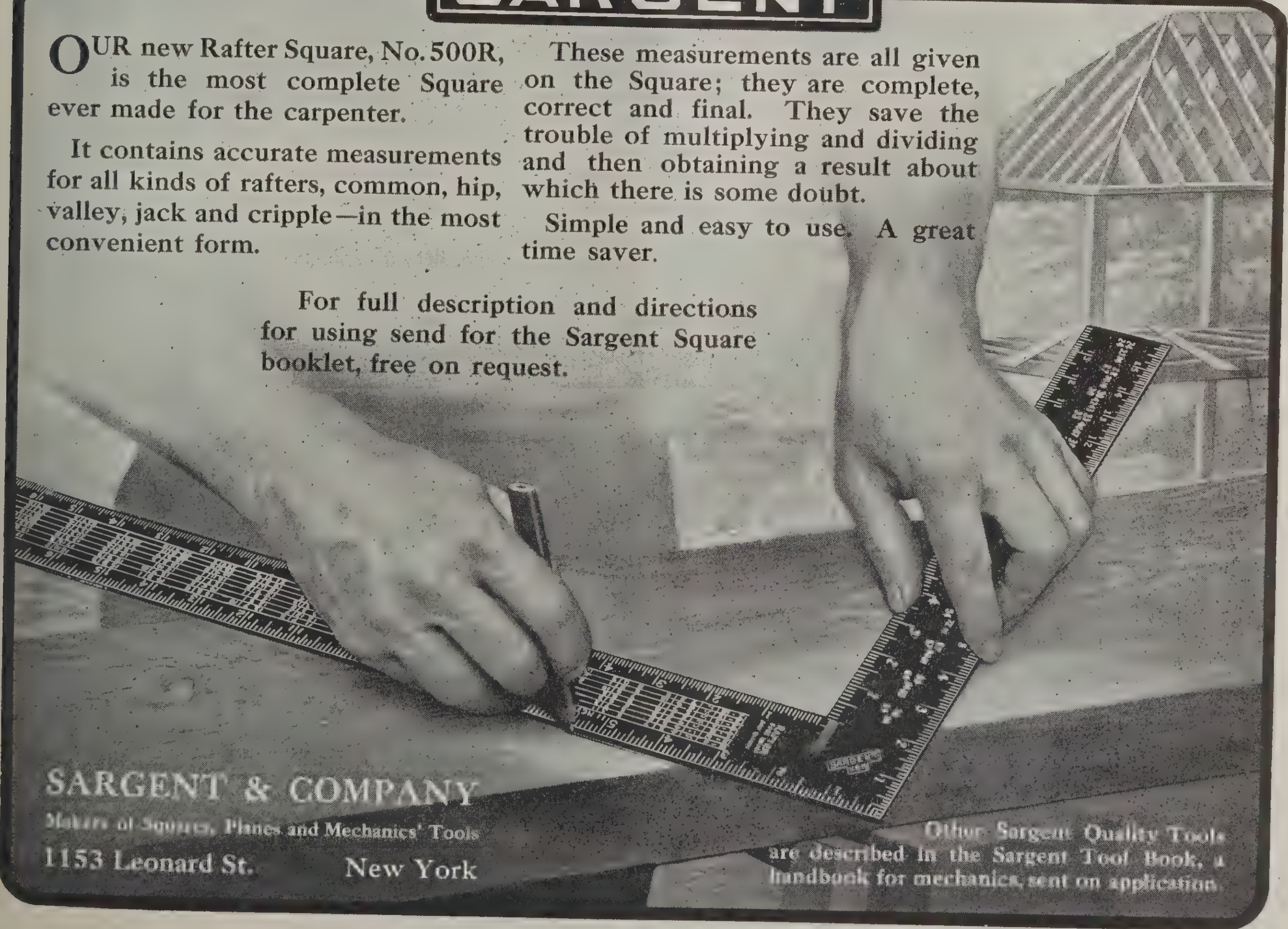
OUR new Rafter Square, No. 500R, is the most complete Square ever made for the carpenter.

It contains accurate measurements for all kinds of rafters, common, hip, valley, jack and cripple—in the most convenient form.

These measurements are all given on the Square; they are complete, correct and final. They save the trouble of multiplying and dividing and then obtaining a result about which there is some doubt.

Simple and easy to use. A great time saver.

For full description and directions for using send for the Sargent Square booklet, free on request.



SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application.

Sharpens Quicker Than Any Other Oilstone

You sharpen tools *on your own time.*

It is *worth money* to you to own and use the fastest cutting oilstone you can get.

Scientific tests recently made in a big testing laboratory at Worcester, Mass., PROVE that the fastest cutting oilstone on earth is the

PIKE INDIA OILSTONE

These same scientific tests also proved that Pike India Oilstones *last longer* and *hold their shape* longer than any other oilstone made.

They save you *time* by sharpening quicker.

They save you *money* by lasting longer.

And if properly oiled, Pike India Oilstones *won't glaze.* Also they are so *tough* that even dropping them won't break them.

It *pays* you to own and use Pike India Oilstones. They cost a little more than a cheap stone—but *aren't they worth it?*

"Pick a Pike"

Your dealer will show you some of the different sizes in coarse, medium and fine grit. Own your own oilstone—*don't borrow.* And be sure to insist on *Pike India*—you'll always be proud of one of these wonderful oilstones as long as you live. It is so hard it will cut the best file in your kit. Just to prove this to you, we will send you

FREE—A PIKE INDIA STONE

Send us your dealer's name and 4 cents for packing and mailing and we will send you a sample Pike India Stone. We will also include a copy of "How to Sharpen"—the most complete booklet ever written on how to put a good edge on knives, tools, etc., and how to select and care for oilstones. You'll be pleased. Write today.

PIKE MANUFACTURING CO.
104 Main Street Pike, N. H.

PIKE INDIA OIL STONES COARSE FINE

when so ordered. The cabinet is made by the Hess Warming & Ventilating Company, 1201 Tacoma Building, Chicago, Ill., which states that styles E, F, G and H are sold extensively through dealers and to consumers throughout the country. The cabinets finished with one coat only and designated as styles J, K, L and M are offered direct to contractors and not through dealers. The company has just issued a very neat and attractive pamphlet showing the various styles manufactured and giving full information in regard thereto. It is also sending out to building contractors only a price list of the various styles of medicine cabinets manufactured.

All Steel Sanitary Refrigerators

An important feature of the equipment of the modern home, whether it be in a detached private dwelling or in an apartment house, is the family refrigerator. First and foremost in connection with an article of this kind is sanitation. This includes the use of a material which is impervious to moisture, water-tight construction, absence of cracks or lurking places, smooth walls and interior parts so made that all can be easily removed and cleaned. Second in importance is economy of operation. Third is ease and convenience of cleaning, and fourth and last in the points which decide the desirability of a refrigerator, is the price. In an interesting pamphlet sent out by the Success Mfg. Company, 406 Sargent Street, Gloucester, Mass., and known as "Catalogue F," there is shown the cottage style of refrigerator which we illustrate in Fig. 12 of the engravings. This all-steel sanitary refrigerator has walls made in nine layers, the middle one being an air space and the two outer layers are of steel, galvanized, enameled and baked. Between the air space and the steel on each side are two layers of waterproof paper and one of sanitary quilt, all of which results in satisfactory insulation. The bottom, top and doors are constructed the same as the walls. All joints are soldered air and water tight before enameling and all doors close into rubber strips rendering them practically air tight. The inside finish is white enamel, four coat work, each coat being baked on separately. The outside finish is white enamel or aluminum according to preference. The ice chamber which is one of the most important points about a refrigerator has protective walls of heavy galvanized steel reinforced and corrugated to secure the greatest strength. The ice rack is of similar construction. All these parts are removable which is a most important consideration for cleanliness. The shelves are made of heavy woven wire electric welded and tinned so that they will not rust. The drip pipe of heavy galvanized steel is easily removable and is fitted with a water trap at the top to prevent the escape of cold air. The general construction of the refrigerator is such that the air is

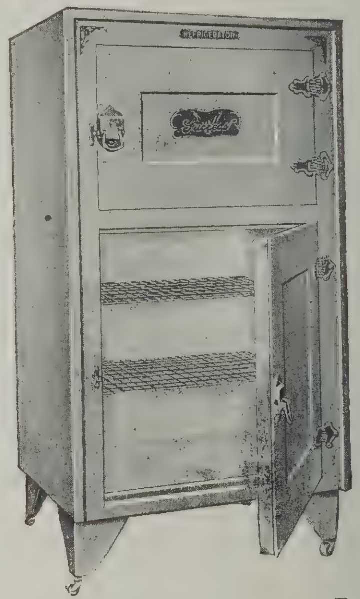
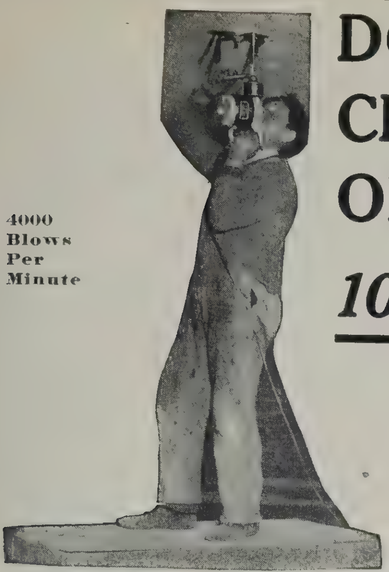


Fig. 12—The "Success" All Steel Sanitary Refrigerators

(*Continued on page* 102)



DO YOUR DRILLING, CHIPPING, CAULKING OR SURFACING

10 Times As Fast

By Using
Either
An

Electric Hammer

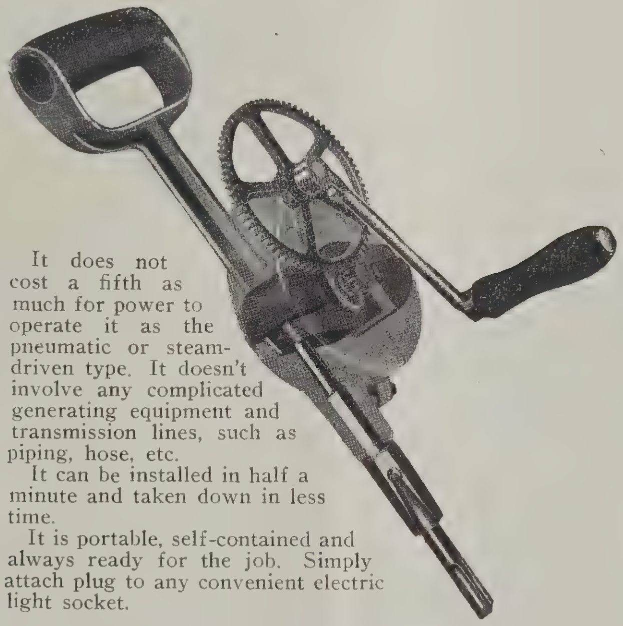
Or the Manually Operated

Drilhammer

If you have a lot of work to do, the solution of the problem for you is our ELECTRIC HAMMER.

If you have but a small amount of work to do at any one time, the DRILHAMMER is the thing to use.

Our ELECTRIC HAMMER is ten times as rapid as the crude, old-fashioned hit-and-miss method of striking the head of a drill or chisel with an ordinary hammer.



It does not cost a fifth as much for power to operate it as the pneumatic or steam-driven type. It doesn't involve any complicated generating equipment and transmission lines, such as piping, hose, etc.

It can be installed in half a minute and taken down in less time.

It is portable, self-contained and always ready for the job. Simply attach plug to any convenient electric light socket.

This ELECTRIC HAMMER is practically automatic — same pressure which holds tool against work closes switch in handle and starts operation. Delivers four thousand blows a minute. Built for various voltages. Requires only one to two amperes on 110-volt circuit. Bulletin "A. H." describes it.

For use on direct current or can be used on alternating current by using a motor generator set.

The Drilhammer

Does the work in one minute that takes ten times as long by cruder methods. Strikes 1,000 powerful hammer blows per minute. Operator simply turns the crank. Centrifugal force does the work. Hardened tool steel hammer elements revolving at high speed strike the blows.

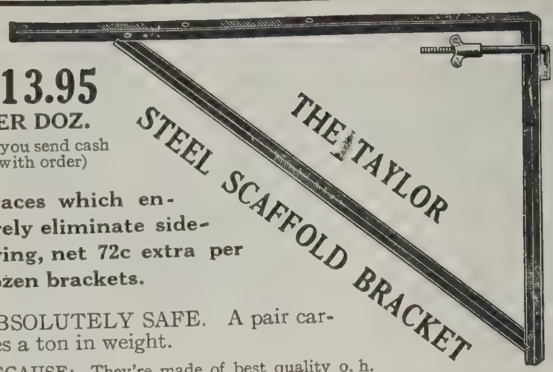
Exceedingly simple in construction. Has no springs to weaken or wear out. Will tremendously cut down the cost of drilling concrete, brick, stone tile, conduit, walls, floors, ceilings, etc.

Made in two sizes and accommodates drills from ¼ to 1¼". Can be carried in regular tool kit. Sold at a price which will enable every electrical worker and mechanic to have one in his kit. Write for Bulletin "Y" and prices.

ORR & LOCKETT HARDWARE CO
Established 1872

Main Office, 14-16 W. Randolph St., Chicago

Branch Offices { 401 Broome St., New York
Room 608-79 Milk St., Boston



$13.95
PER DOZ.
(If you send cash with order)

Braces which entirely eliminate side-swing, net 72c extra per dozen brackets.

ABSOLUTELY SAFE. A pair carries a ton in weight.

BECAUSE: They're made of best quality o. h. angle steel; so constructed that no strain comes on the rivets; nuts fasten on the outside, which prevents accidents.

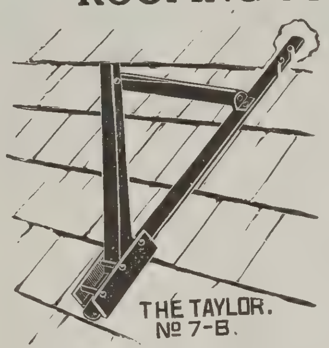
LAST A LIFETIME

SAVE TIME—one man alone can easily put them up and take them down.

REVERSIBLE—short arm can be used to support platform where space is limited between two houses.

Price of 4 ft. size given above; also made in 5 ft. size

ROOFING BRACKETS


THE TAYLOR.
Nº 7-B.

Held by two 8-penny nails driven into sheathing and rafters. A single bracket has supported 1106 lbs.

For slating or asbestos shingles longer strap having two extra notches is used.

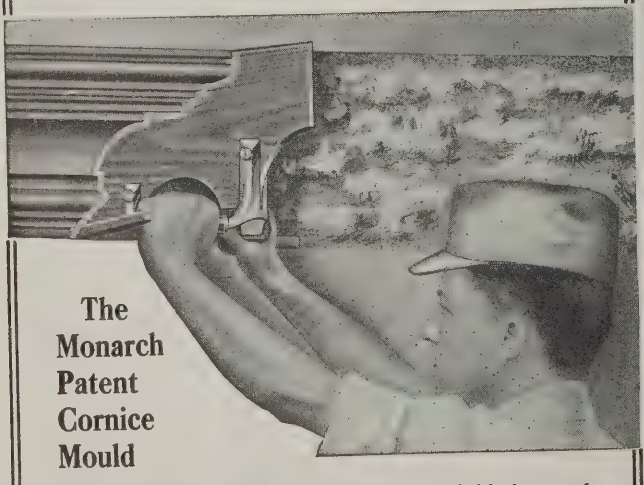
Contractors pronounce them "the best ever".

Builders' Specialties Catalogue

free on request

JAMES L. TAYLOR MFG. CO. **Poughkeepsie, N.Y.**

FREE



The Monarch Patent Cornice Mould consists of a blade holder, ten assorted blades, and a brass blade scraper. This Mould has a wall and ceiling guide. Impossible to do a poor job. Frame is made of red birch and black cherry. Metal parts of aluminum—strong, light and non-rusting. Blades of zinc encased in white pine specially treated with oil to resist action of water and plaster.

The most expert hand-troweling cannot make as perfect plaster cornices and corners as the MONARCH CORNICE MOULD.

This tool will save you hours of time and hard labor. Makes the plasterer's work easy. A sure money-maker.

DON'T SPEND A CENT

Just send me your name and address. Tell me you want the Monarch Cornice Mould on *Ten Days' Free Trial.* Use it ten days and if it don't please you, send it back, that's all.

Get Your Cornice Mould Quickly by Writing Today

TIMOTHY F. HORAN, 369 Otsego Street
Ilion, N. Y.

kept constantly in circulation up to and over the ice and down through the food compartments.

Copper Weather Vanes

E. G. Washburne & Co., 208 Fulton Street, New York City, is favoring its friends in the trade with a copy of a very attractive catalogue of copper weather vanes which are manufactured in great variety and adapted to meet many requirements. These vanes are made entirely of copper and brass, the balls being of copper, the points of the compass are cast iron and the upright rods or spires are of wrought iron with steel spindles on which the vanes revolve. All parts are well painted, while the revolving sections, balls and letters of the points of the compass are gilded with 22 karat gold leaf. New and original designs are continually being added to the stock of the company and illustrations or sketches will be furnished on application. The various designs of weather vanes illustrated and described are shown in the catalogue in colors to represent the actual material in which they are made. In addition to the designs presented are tables of prices and also brief reference to copper lightning rods.

The Disston Carpenter's Bevel

A tool that is always regarded as a valuable adjunct of the "kit" of the up-to-date building mechanic is a bevel and try square, as he finds it most serviceable in connection with a great variety of carpenter work. A tool of this nature which embodies features of construction that cannot fail to strongly appeal to the practical man is the Disston Bevel, illustrated in Fig. 13 of the engravings. It embodies a patented feature in the shape of a ball bearing in the end of the iron stock. Simply turning the wing nut or thumb screw as some might designate it forces this ball against the screw that passes through the blade and firmly holds it. A half turn is sufficient to tighten it. When the blade is extended to its full length, which by the way is the greatest test of all, the ball bearing is said to hold it as solid and firm as in any other position. The Disston bevel is accurate, practically indestructible and yet very simple of construction. Every detail of its manufacture receives careful attention and the result is a tool which is found satisfactory in all respects.

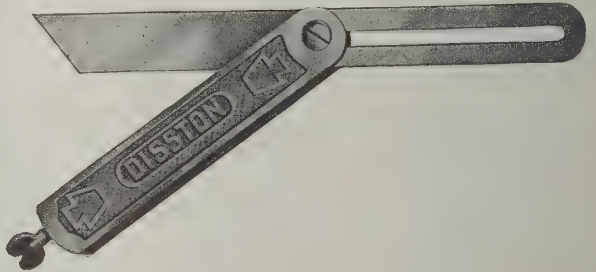


Fig. 13—The Disston Carpenter's Bevel

C. H. & E. Contractors' Equipment

There has just been issued from the press by the C. H. & E. Mfg. Company, 330 Mineral Street, Milwaukee, Wis., a very attractive catalogue of contractors' equipment embracing as it does portable saw rigs, builder's hoists, material elevators, mortar mixers, gasoline engines, concrete chutes, pumps of various kinds, etc., etc. The matter is profusely illustrated with half tone engravings, and special attention is directed to the greatly increased facilities which the company now enjoys enabling it to manufacture in large quantities and thus offer its goods at a price at which every contractor can afford to install one or more of its equipment on his job. The company states on the last page of the catalogue that it absolutely guarantees every machine "against imperfection in material and workmanship for a period of one year from date of delivery and agrees to replace any broken or damaged parts of machine when breakage or damage is shown to be due to imperfect material or faulty workmanship." A copy of this interesting catalogue will be sent

(*Continued on page* 104)

On all woodwork where a filled grain effect is desired use Johnson's Paste Wood Filler

Floors finished with Johnson's Paste Wood Filler are sure to give satisfaction

1 lb. of Johnson's Paste Wood Filler FREE

Johnson's Paste Wood Filler is unquestionably the best on the market. All classes of trade, including furniture manufacturers, prefer it.

It will not harden in the cans, and may be wiped with equal ease in ten minutes or two hours after being applied. It does not settle after thinning.

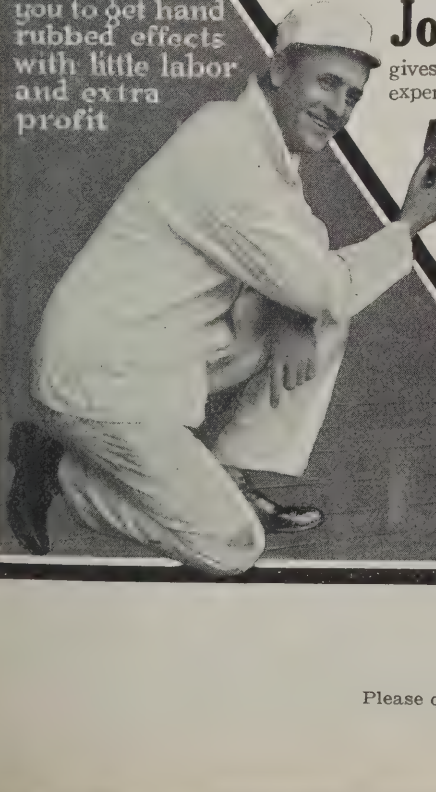
Johnson's Paste Wood Filler is made in several shades—*Natural, Dark Oak, Golden Oak, Antwerp*, etc. The Natural is slightly tinted with Ochre so it will not show white in the grain of oak, maple and other woods. Mail the coupon and secure free and postpaid a pound of Johnson's Paste Wood Filler for trial. We will also send you a free copy of our 25c book "The Proper Treatment for Floors, Woodwork and Furniture," which gives detailed information on finishing wood—soft or hard—old or new.

Johnson's Prepared Wax

is a complete finish and polish for all wood—floors, woodwork and furniture. Apply with a cloth and in five or ten minutes polish with a dry cloth. Gives perfect results over any finish—varnish, shellac or oil. For polishing **automobile bodies** and bar tops it has no equal!

Johnson's Flat Wood Finish

gives that artistic, hand-rubbed effect at one-third the expense. Does not require rubbing or polishing. Remember—for any work on any wood Johnson's Finishes are best.



Johnson's Flat Wood Finish enables you to get hand rubbed effects with little labor and extra profit

Johnson's Prepared Wax is a lasting artistic finish for floors—new or old—soft or hard

Please send me free and postpaid a pound sample of Johnson's Paste Wood Filler. I agree to try it and report results to you.

I buy paints from......

Name......

Address......

City......

State......

To
S.C.Johnson & Son
"The Wood Finishing Authorities"
Racine, Wis.
C B-4

1500 TOOLS

No matter what kind of work you have to do you will find that it can be done easier and better with

Goodell-Pratt's TOOLS.

No matter whether you are a carpenter, machinist, tool maker, or householder; if you want better tools than you have been accustomed to, ask your dealer to show you

Goodell-Pratt's TOOLS.

WRITE FOR OUR CATALOG.

GOODELL-PRATT COMPANY,
Toolsmiths
GREENFIELD, MASS., U. S. A.

to any reader of *The Building Age* who may apply for it. Accompanying the catalogue is a large folder showing the eight-story 300-room Hotel Russell-Lamson in course of construction and "the C. H. & E. family on the job." In this particular "family" is included the company's No. 4 saw rig, a material elevator, a mortar mixer, an electric hoist and a power driven Bilge pump. The folder is printed in colors and there is also given a great deal of interesting information about other members of the C. H. & E. "family."

Catalogue of Sawmill and Woodworking Machinery

An attractively arranged and carefully compiled catalogue of 164 pages 6 x 9 in. in size bound in paper covers and illustrating and describing a varied line of saw mill and woodworking machinery has been issued from the press by the American Saw Mill Machinery Company, 82 Main Street, Hackettstown, N. J., and with New York office at 1362 Hudson Terminal. It is known as Catalogue No. 17, the appearance being indicated in Fig. 14, which shows the cover design.

A feature of the cover design, which is in three colors, is the draped American flag surmounted by the American eagle. For years this has been a characteristic mark of the catalogues of this company, the distribution of which all over the world has doubtless been effective in visualizing before foreign markets the progressiveness of American machinery manufacturers. The catalogue lists with unusual care in detail the complete line of "American" saw mills and saw mill machinery, wood-working machinery, saws and accessories for the woodworking plant, contractors' woodworking equipment, and stationary and portable boilers and engines. In fact, the concern contemplating the erection of any plant for working wood for any purpose can find within the pages of this catalogue a complete equipment. The new catalogue closes with several pages of the kind of information a practical man needs on installing and running saw mills, the proper speed for saws of various sizes, the care of saws, etc. In addition to its home business, the American Saw Mill Machinery Company does a large export business, its machines going to all lumber-producing countries of the world. Catalogues are issued in several foreign languages. The location of the company's works gives it peculiarly advantageous facilities in placing its product on board ship in short time and at low cost. To care for its domestic trade, the company maintains offices and warehouses at Savannah, New Orleans, Chicago and Seattle.

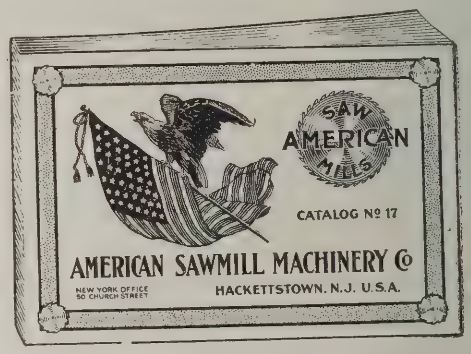

SAW
AMERICAN
MILLS
CATALOG No 17
AMERICAN SAWMILL MACHINERY Co
NEW YORK OFFICE 50 CHURCH STREET
HACKETTSTOWN, N.J. U.S.A.

Fig. 14—Cover Design of Woodworking Machinery Catalogue

Layout of Machine Equipment for Carpenter Shop

Practically every enterprising carpenter does more or less of a contracting business as does also the local builder, and to meet his needs he finds it necessary to operate a small shop equipped with a half dozen or more machines of a varied nature and designed to turn out a maximum of work with a minimum of labor. For the purpose of showing carpenters and builders a convenient plan to follow in the layout of machines in his woodworking shop the J. A. Fay & Egan Company, 221-241 W. Front Street, Cincinnati, Ohio, is sending to those making inquiry for it a blue print together with a catalogue of machines especially adapted for small shops of this character. The blue print indicates

(*Continued on page* 106)

REO MOTOR TRUCKS

Builders and contractors have found Reo Motor Trucks not only save money in the hauling of all kinds of materials, but earn dividends by cutting out costly delays in the transportation of lumber, brick, tile, cement, etc.

With a Reo Truck "on the job," your men are never kept idly waiting for necessary materials. It furnishes a safe, sure and economical means of supply to every job on which you are working.

In any line of industry where speed and low cost of hauling count, Reo Motor Trucks have won the enthusiastic endorsement of business men. If you want to cut costs in delivering your goods, "you can do it with a Reo."

Here are a few of the features that have given the Reo its position of leadership in the two-ton field:

Sectional radiator, of 24 separate, interchangeable units; motor, clutch and transmission cushioned on a sub-frame, away from jars and road shocks; left side drive and center control; big armored front frame; demountable driver's cab; gas lights and Prest-O-lite tank, and every other constructive refinement suggested by the best engineering practice.

While the price of 54 competing trucks averages $2701, the REO Two-Ton Truck sells for $1650, chassis only, with driver's cab; body extra. You can have any style body to suit your individual requirements.

Reo dealers everywhere, ready to give Reo service.

Send for the REO Truck catalog, and let us give you some expert advice on the subject of hauling

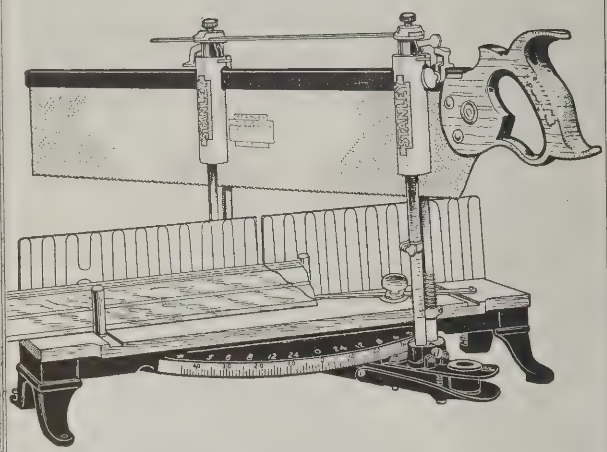
$1650

Chassis with
Driver's Cab.
Body Extra.

Your choice of wheel base—130 inches or 146 inches.

REO MOTOR TRUCK CO.
LANSING, MICHIGAN

Stanley Tools



Stanley Mitre Boxes

STRONG — DURABLE — ACCURATE

A Few Striking Features

Saw is held above work when not in use.

Swivel is automatically locked at any angle.

Two sockets in swivel for use of long or short saw.

Narrow opening in back of frame, especially adapted for small work.

Steel rod uprights for saw guides.

Uprights adjustable for saws of varying thicknesses and for those that run out of true.

Stock guides for holding work in place.

Extra wide range of work—will saw at angle of 30 degrees.

One-Piece frame with detachable Malleable iron legs.

Construction thoroughly mechanical; all parts interchangeable and readily replaced if lost.

Quickly and easily put together or taken apart for carrying.

A specially made Back Saw furnished with each box.

SEND FOR SPECIAL CIRCULAR

ADDRESS

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

a shop 30 ft. wide by 60 ft. in length with a line shaft running longitudinally through the center. From this line shaft is belted on one side of the shop a knife grinder, a friezer, a band saw, a jointer and a surfacer, while on the other side is a band saw filer, a tenoner, a mortising machine and a variety saw. In connection with each machine the sizes of pulleys are given together with the number of revolutions which they should run per minute.

Wrought Metal Screen Door Latch Sets

A line of screen door latch sets, both mortise and rim, which possess features likely to interest a large number of our readers, has just been placed on the market by the Shelby Spring Hinge Company, Shelby, Ohio, which for many years has made the well-known Shelby Chief floor hinge together with an extensive assortment of builders' hardware. These sets are made of wrought metal and are finished to match other builders' hardware. The mortise set which we illustrate in Fig. 15 consists of a 1⅜ x 2-in. latch with steel latch bolt and one pair of 1½ x 4½-in. escutcheons. The inside escutcheon is equipped with a slide lock which secures the door from the inside. There is also a one-piece wrought metal knob for the outside and a cast lever for the inside. Among the parts constituting the rim screen door latch set not shown here is a 2 x 2⅜-in. latch equipped with a slide lock operated from the inside and which works on either right or left-hand doors. There is also a reverse bevel slide, an angle strike, a wrought metal outside knob and an inside cast lever. Each set is packed in a box complete with screws.

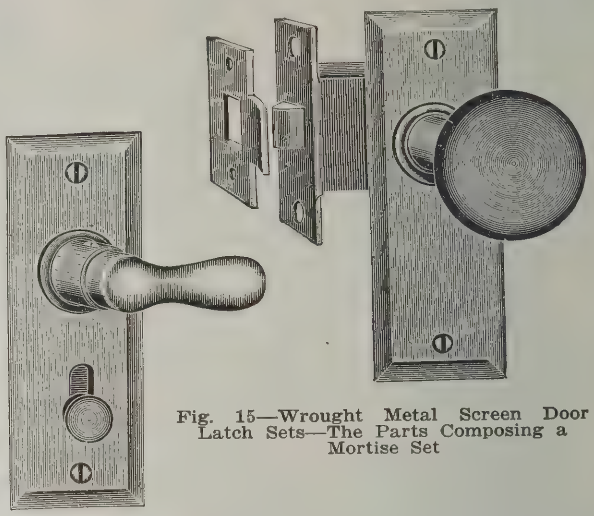


Fig. 15—Wrought Metal Screen Door Latch Sets—The Parts Composing a Mortise Set

Laying Hardwood Flooring

As we have frequently stated in these columns the laying of hardwood flooring is not a complex piece of work but that any first-class carpenter who is at all clever in his line can do a good job, although of course care is necessary for the best results. On this point there are some very pertinent comments contained in the catalogue and price list just issued by the John Schroeder Lumber Company, Milwaukee, Wis., and bearing the title "Steel-Polished Perfection" Hardwood Flooring. We quote as follows:

"The laying of Hardwood Flooring is not very difficult. Any first-class carpenter can do a good job, but care is necessary for the best results.

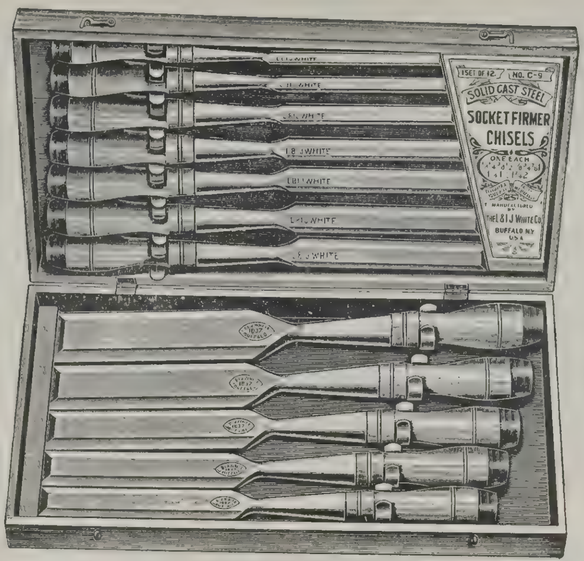
A sub-floor should be used under both the 13/16-inch and ⅜-inch thicknesses. The sub-floor should be reasonably dry and laid diagonally. Boards of about 6 or 8 inches wide are preferred. These boards should be thoroughly dried out and cleaned before the flooring is laid.

It is well to use a damp-proof paper between the hardwood flooring and the sub-floor. For sound-proof proof results, a heavy deadening felt is recommended.

The nailing of hardwood flooring is very important. All tongued and grooved Hardwood Flooring should be blind nailed. The best floor made can be spoiled by the

(Continued on page 108)

Set R 2



Set C-9

Another Opportunity

for the carpenters who want the best to get a trial set of chisels. We will send postpaid to any place in the U. S. set R-2 for $4.00, set C-9 for $8.00. If we have a dealer in your town, we will ship through him. These prices are a considerable saving over our regular prices and are for a limited time only. If you want a set of chisels that will give you full value—that are worth 100 cents for every dollar you spend, send us money order today. Remember, we guarantee satisfaction.

Do you use adzes of any kind? Send for our new adze booklet.

Do it Now—You May be Busy To-morrow

The L. & I. J. White Co., 100 Perry St., Buffalo, N. Y.

GOODELL

You Will Buy This All-Steel Mitre Box

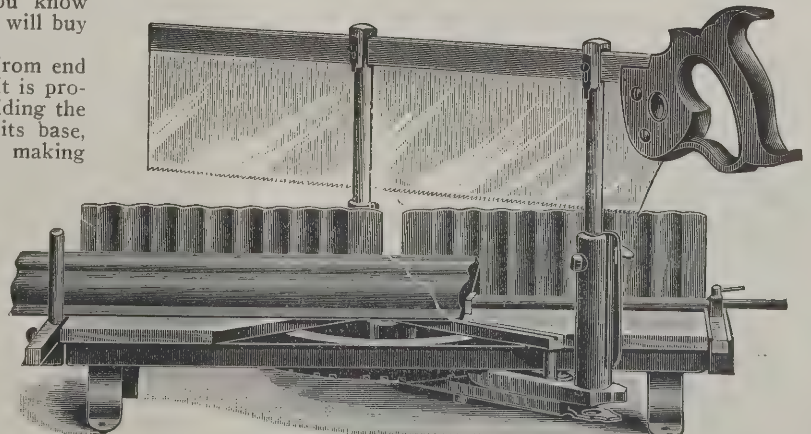
In fact you can't help buying it if it's shown to you, and the more you know about mitre boxes the quicker you will buy it.

The Goodell is made of Steel—from end to end and all the way through. It is provided with automatic stops for holding the saw, it has an accurate scale in its base, and is fitted with a gauge for making duplicate cuts, etc.

It cannot break and get out of order—it is always ready to do fast, accurate work at no notice.

Send for Circular K and prices—now, in time to have it for your spring building work.

Goodell Mfg. Co.
Greenfield, Mass.



use of improper nails. The steel cut variety is recommended for all blind nailing.

For 13/16-inch use 8-penny steel cut flooring nail.
For ⅜-inch use 3-penny wire finishing nail.
The maximum distance between nails should be:
For 13/16-inch thickness.......16 inches
For ⅜-inch thickness.......... 8 inches

For even better results, it is recommended that the nails be driven closer—especially in ⅜-inch flooring.

Don't expose hardwood flooring to moisture. Keep stored in a dry place until ready to lay.

Don't lay flooring over fireproofing material until the latter is thoroughly dried out.

Don't allow workmen to handle fine flooring roughly as though it were ordinary lumber.

Don't lay *thin* flooring without nailing at least every six to eight inches.

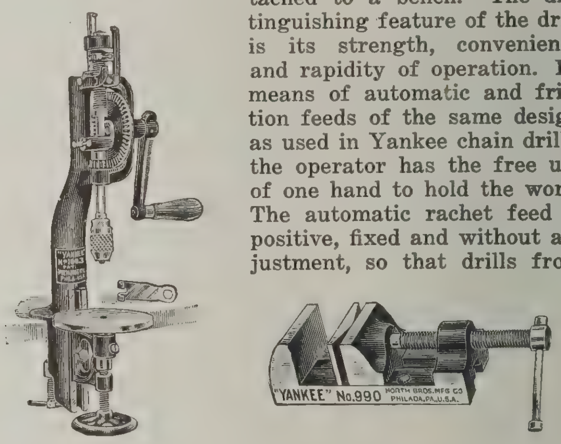
Don't order more flooring than the job requires. We positively cannot take back any unused flooring. "Steel-Polished Perfection" is stored in our dry-air storage warehouse until it is shipped, and in fairness to our customers we cannot accept returned flooring.

Don't lay flooring over an old floor until its surface has been made perfectly level.

Don't fail to state, when ordering, the amount, grade, size and kind of flooring wanted.

"Yankee" Bench Drill and Vise

North Bros. Mfg. Company, Lehigh Avenue, Philadelphia, Pa., has just placed upon the market some new "Yankee" devices which we illustrate herewith. One of these is a Yankee bench drill with automatic friction and rachet feed as shown in Fig. 16, while the other is the Yankee Vise No. 990 shown in Fig. 17, and which may be used with the bench drills or separately, attached to a bench. The distinguishing feature of the drill is its strength, convenience and rapidity of operation. By means of automatic and friction feeds of the same design as used in Yankee chain drills, the operator has the free use of one hand to hold the work. The automatic rachet feed is positive, fixed and without adjustment, so that drills from No. 54 up will not be broken in use as is often the case in feeding by hand. A bracket at the top of the frame with right and left arms, disengages the ratchet feed at the extreme up or down movements of the spindle so that the parts cannot be jammed. The Yankee bench drill is made in two sizes, the No. 1003 for drills up to ¼ in. inclusive, having one speed only, while No. 1005 for drills up to ½ in. inclusive, has two speeds.

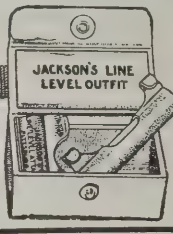


Figs. 16 and 17—The "Yankee" Bench Drill and Vise

The Yankee vise has body and sliding jaw of cast iron to hold work square when used either flat or on the sides. The sliding jaw has a T-shaped block screwed to its under side, sliding in a T-shaped slot, thus insuring parallel movement of the jaw. A removable swivel jaw made of steel is provided to hold taper work. The stem has a friction spring to hold the jaw in position. The adjusting screw is of steel of ½ in. in diameter with ¾ in. head to receive the sliding bar. The boss on the end of the body in which the screw works is ⅞ in. long. Two countersunk holds are provided in the base to screw the vise to the bench if desired. The base of the vise is 6 in. long and 2⅜ in. wide, while the extreme hight is 2 in. The opening of the jaws without swivel jaw is 3 in. and with swivel jaw 2⅝ in. The vise weighs 3¾ lb.

(*Continued on page* 110)

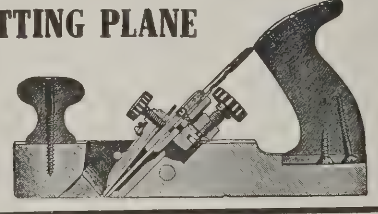
1853 BUCK BROS. 1913
BUCK BROS
Buck Brothers' Tools are LASTING tools—they keep their edge.
We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.
BUCK BROS., Millbury, Mass.



A UNIQUE TIME SAVER
The Jackson Aluminum Line Level makes big saving of time and labor. Takes the place of the old-fashioned sixteen foot straight edge. May be carried in vest pocket. No contractor, builder, carpenter, etc., can afford to be without. Stretch line and hang the level on it—It's positively accurate. Complete outfit goes into neat leatherette case and consists of the level with 40-ft. line also spring clamp for attaching level to steel square or pocket rule, thereby serving as a plumb rule or bench level. Ask your dealer or send $1.00 for outfit complete post paid. Send for Tool Catalog.
J. Woodwell Co., Sole Agts., 200 Wood St., Pittsburgh, Pa.

Do you want the best
DRAWING TABLE
made? If so, send for illustrated catalogue and prices
R. E. KIDDER
22 Hermon Street Worcester, Mass.

JOHNSTON'S Patent SHELF PIN
1 DOZ. 15¢
1 GROSS 85¢
These Pins are used for supporting movable shelves in Book Cases. Cannot fall out or sag down. The best shelf pin made. Easily put in place by any one.
Send for free sample to J. D. JOHNSTON, NEWPORT, R. I.

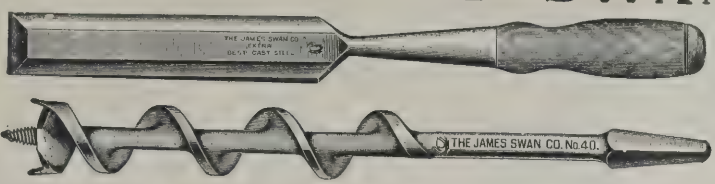


ONLY SELF-SETTING PLANE
Sent on trial as per circular. Our $1.00 certificate if you mention this paper.
GAGE TOOL CO.
Vineland, N. J.

ROOFING SLATE
OF QUALITY
MINERS The AULD & CONGER Co. MANUFACTURERS
DEPT. A.
ESTABLISHED CLEVELAND, OHIO. 1870

SILICA-graphite is Nature's own paint pigment and, as mixed with pure boiled linseed oil in
DIXON'S SILICA GRAPHITE PAINT
forms the best protection against Nature's own most powerful agents of corrosion and decay. Booklet 32-B
Made in Jersey City, N. J.
Joseph Dixon Crucible Co.
Established 1827.

STOP THOSE RATTLING WINDOWS
Do away with sash weights, cords, pulleys and pocket frames and save money by using
AUTOMATIC SASH HOLDERS
Proved by Use—Unexcelled for windows without pocket frames. Excellent for new windows.
Send for circular and prices, or $1.00 for trial set prepaid; state approximate weight of sash.
AUTOMATIC SASH HOLDER MFG. CO., 46 Church St., New York.

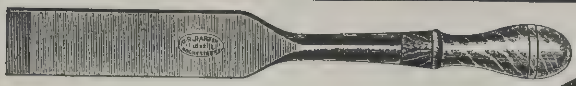

THE JAMES SWAN CO.
THE JAMES SWAN CO. No. 40.

LOOK FOR THE "SWAN" TRADE MARK

On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.



MACK & CO.

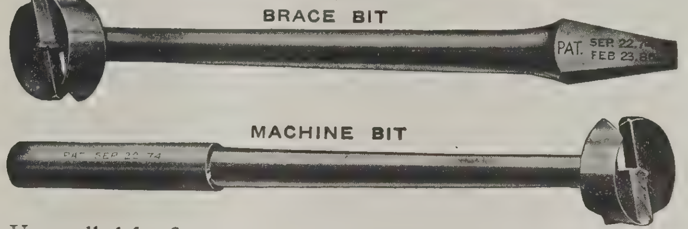
The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

D. R. BARTON 1832 ROCHESTER, N.Y.

Brown's Race
Rochester, N.Y.

THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.



Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

"YANKEE" R & L SPIRAL-RATCHET DRIVER
NORTH BROS. MFG. CO. PHILADA. PA. U.S.A.

You can now get this large "YANKEE"

with spring in the handle to drive it back quickly for the next push.

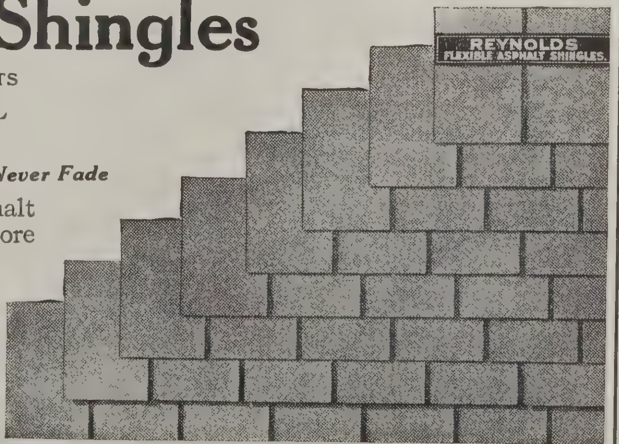
"YANKEE"
Quick Return
No. 131

A quick and powerful tool for carpenters. Drives or draws most any wood screw in one tenth the time of an ordinary driver. Takes all the Yankee attachments.

Your dealer sells the "Yankee."

☞ *Send for the "Yankee" Tool Book anyway*

NORTH BROS. MFG. CO., Lehigh Ave., Philadelphia, Pa.



Reynolds Asphalt Shingles

ENDORSED BY LEADING ARCHITECTS

GUARANTEED FOR 10 YEARS—WILL LAST MANY YEARS LONGER

Natural Colors of Garnet, Red, Gray and Green, Which Never Fade

We are the ORIGINAL MAKERS of Flexible Asphalt Shingles and tested our product for ten years before putting it on the market. Let us send you a booklet.

H. M. Reynolds Asphalt Shingle Co.
West Grant Street Grand Rapids, Mich.
Established 1868

You Can Make
Money with a

**Millers Falls
Boring Machine**

MILLERS FALLS CO. MILLERS FALLS, MASS. U.S.A.

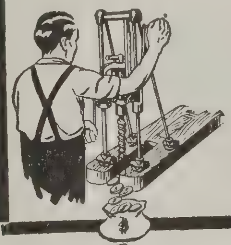
Because it will do better work in less time than any other machine of its class; hence effects a direct saving in wages.

Has every convenience for quick and easy handling. Will bore at any angle from the vertical within an arc of 50°; depth of hole regulated by stop; frame locks at top automatically; speed and power readily adjusted by the cranks.

The biggest item of cost in carpenter work is labor, and the device that lessens this is the device it pays to use. That's the reason why it would pay **you** to try our Boring Machine.

**Millers Falls
Company**

28 Warren Street
New York



SEND $1.00

for this

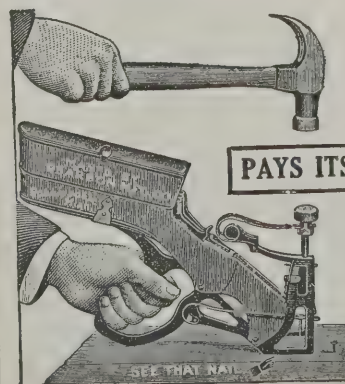
remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending $1.00 for this attractive offer. We prepay postage.

Otis A. Smith **Rockfall, Conn.**

Pearson's Automatic Shingle Nailer



Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only $5.00 It makes good.

Pearson Mfg. Co.
Robbinsdale, Minnesota

Nickerson's Double Lock Joint Columns

An attractive catalogue of 32 pages which reaches us from Nickerson Mfg. Company, Knoxville, Tenn., contains much interesting matter relative to the Nickerson Patent Double Lock Joint Columns for porches and interiors. Various styles of column are shown, together with some of the many buildings in connection with which the columns have been utilized. The catalogue also shows various designs of balusters, hand rails, composition capitals, etc. Numbers, sizes and prices are a feature in connection with the latter.

TRADE NOTES

The H. B. Ives Company, New Haven, Conn., are directing special attention to its window ventilating lock by means of which windows may be left open either at the top or bottom or at both bottom and top with entire security against intrusion. The popularity of the goods of this concern is strikingly evidenced by the use of its Crescent sash fasteners in the 55-story Woolworth Building, which, as every one knows, is the highest office structure in the world. The sash fastener is made in five sizes suitable for wood and metal sash. Another specialty of the company is the Ives patent window stop adjuster designed for preventing the entrance of drafts and dust and also obviates any rattling of the window. It is made of one piece of metal with solid ribs and heavy bed that will not cup or turn in tightening the screw. The company has issued a very neat folder relating to these specialties and a copy of it can be secured by any reader of *The Building Age* on application to the address given.

Pike Mfg. Company, 104 Main Street, Pike, N. H., calls attention to the merits of the Pike India oilstone which scientific tests have proven to be fast cutting, durable and economical of both time and money for sharpening tools. The company offers to send a sample Pike India stone free of charge to any reader of *The Building Age* who will forward his dealer's name and four cents in stamps for packing and mailing. The company will also include a copy of "How to Sharpen"—a very complete booklet telling how to put a good edge on knives, tools, etc., and how to select and care for oilstones.

Preston & Walker, architects and engineers, Detroit, Mich., have opened a branch office at 728 Post Building, Battle Creek, Mich. Adelbert B. Chanel has been made associate member of the firm in this branch and will have charge of the Battle Creek office. He was formerly in the office of L. H. Field, Jr., Jackson, Mich., and of C. Howard Crane, of Detroit. The firm is desirous of securing catalogues from manufacturers of materials entering into building construction. The Detroit office is at 1932 Dime Bank Building.

The Carter White Lead Company of Chicago, Ill., has recently erected a new three-story building of concrete. In order to eliminate column obstruction, and at the same time to take care of very heavy concentrated loads and to provide a maximum of space, concrete slab construction was adopted. Plans were prepared by the company's engineering force, H. A. Peters & Co., Chicago, being the general contractors.

The Curtis Door and Sash Company of Chicago will erect a four-story brick factory building, 106 x 225 ft., at 1426-32 South Western avenue, at a cost of $100,000 from plans by Architect M. J. Moorehouse.

The Auld & Conger Company, Cleveland, Ohio, is directing special attention to its line of roofing slate and architects and builders are likely to be interested in the literature which the company is sending out bearing upon its product. The company was established in 1870 and are well known miners and manufacturers of roofing slate of quality.

The Rapid Floor Surfacing Machinery Company, 103-105 N. Canal Street, Chicago, Ill., is the name

(*Continued on page 112*)

Morgan Doors

have been recommended by contractors to their clients for forty years as the standard of beauty, harmony and durability. They constantly protect the contractor's interest and reflect credit on his judgment.

The standard styles and stock sizes of Morgan Doors eliminate guesswork and insure satisfaction. The name "Morgan" on the top rail of every genuine Morgan Door represents an out-and-out guarantee of detail perfection to both contractor and client which is REAL DOOR INSURANCE.

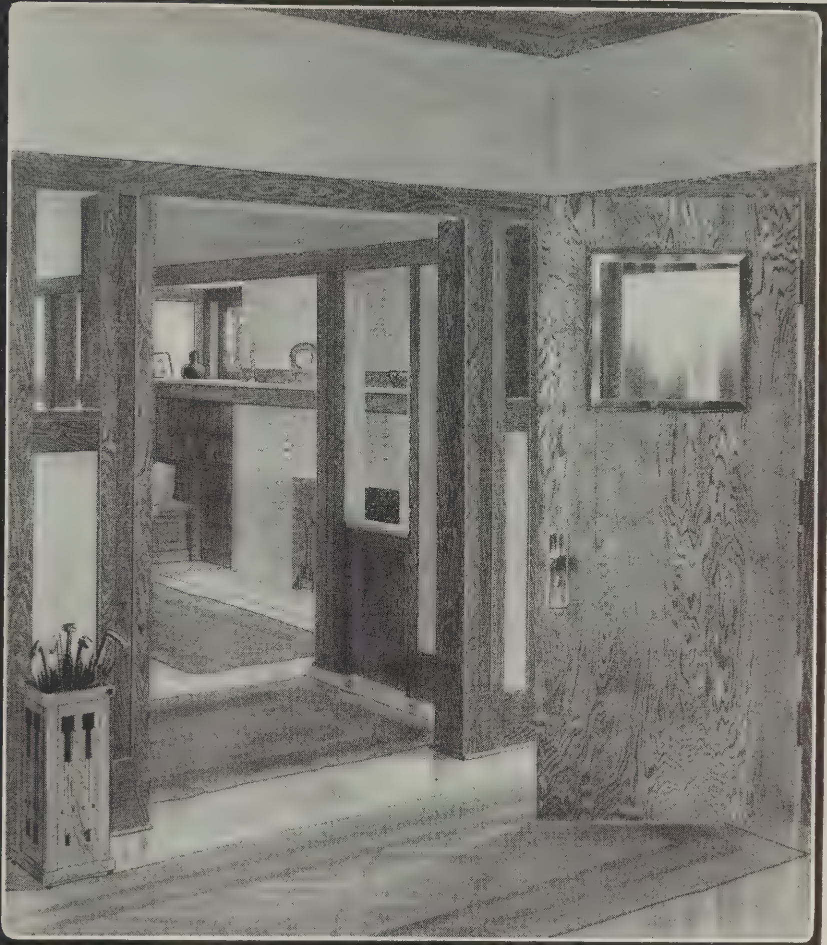
The styles and sizes of Morgan Doors are pictured and described in our book, "THE DOOR BEAUTIFUL." FREE ON REQUEST. Send for a copy.

Architects, see Sweet's Index, Pages 1004 and 1005.

MORGAN DOORS

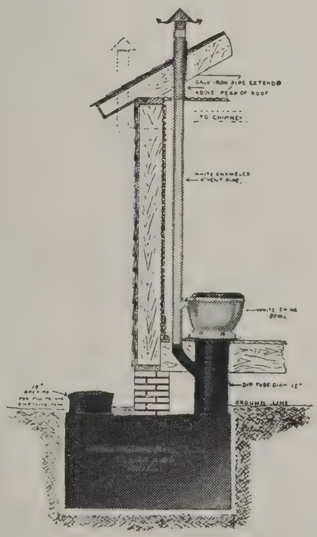
Morgan Sash & Door Co.

Dept. C. 31., Chicago, U. S. A.
New York Office—6 East 39th St., New York City
Factory—Morgan Company, Oshkosh, Wis.
Distributed by Morgan Millwork Co., Baltimore, Md.



Here Is the Invention Paradoxical—

A "Water Closet" Without Water


GALV. IRON PIPE EXTENDS ABOVE PEAK OF ROOF
TO CHIMNEY
WHITE ENAMELED 4" VENT PIPE
WHITE CHINA BOWL
DIP TUBE DIAM 12"
GROUND LINE

The Kaustine Chemical Closet Needs Neither Water Nor Sewer. It is admirably suited to buildings in places where neither sewer nor running water can be obtained. There is no odor. The appearance is similar to that of any high grade water closet. Chemical used costs less than water. Requires an hour a year attention. Nothing to get out of order. No plumbing necessary. Good enough for the finest building, cheap enough for the plainest building.

We have a special "GET ACQUAINTED" Offer awaiting your request. Please state your requirements. Write for literature which is a valuable treatise on the most modern methods of handling sewage where there is no sewer or water.

KAUSTINE CO., Dept. G, **Buffalo, N. Y.**

under which the business of M. L. Schlueter, maker of floor surfacing machines, will hereafter be conducted. We understand that over 5000 machines patented by Mr. Schlueter, are now in use among small and large contractors all over the country. The floor surfacer is made in different sizes for wood floors; also for tile, marble, cement and all kinds of composition floors.

"Paint for the Tin Roof" is the title of an illustrated folder which is being sent out by the Joseph Dixon Crucible Company, Jersey City, N. J. It tells something about Dixon's silica-graphite paint and its protective service. The illustrations include pictures of buildings at Atlantic City where the conditions impose a severe strain on protective paint due to the direct ocean exposure and corrosive salt air. Dixon's silica-graphite paint has protected the roofs of several famous hotels at that seaside resort and the owners express thorough satisfaction with the service rendered.

The Marquette Cement Manufacturing Co., Chicago and La Salle, Ill., has recently completed additions to its works at La Salle, costing $400,000, consisting of a large generator plant, new compressors, grinding machinery and warehouses. These additional facilities will enable the company to increase its yearly production to 3,000,000 barrels of Portland cement.

The line of medicine cabinets turned out by John Cook & Son, Sharon, Pa., are fitted with doors provided with polished bevel plate mirror, 14 x 20 in. in size. The inside measurement of the cabinet itself is 18 x 25 in. and it has a depth of 4 in. The cabinet has three movable shelves, nickel-plated ball tip butts and catch.

Brien Heater Company, Westfield, Mass., has been receiving some very flattering testimonials regarding the merits of its Brien heater by some of those who have practically demonstrated its merits. In one instance where the heater had been installed it gave

(*Continued on page 114*)

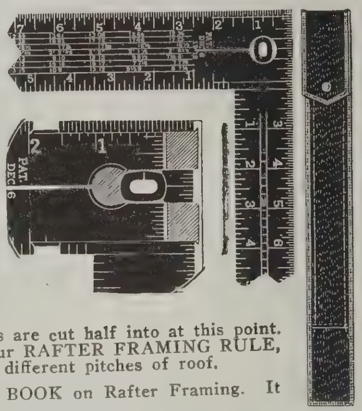
HYNALER Carpenter's Delight

Storekeeper's Drawing Card

Talk of the Town

Buy one today from your dealer or send us 75c. and we will send one prepaid

Double Claw Hammer Company
453 Broadway, Brooklyn, N. Y.



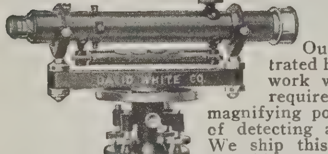
Nicholls Expansion Fit Take Down Square No. 500 R

Eccentric Cam expands end of body in milled portion of tongue, making an absolutely solid joint, also taking up wear. Long bearings assure accuracy.

Strength where tongue joins on to body. All other Take Down Squares are cut half into at this point. These are stamped with our RAFTER FRAMING RULE, giving cuts for seventeen different pitches of roof.

Send for our LITTLE BOOK on Rafter Framing. It is FREE.

NICHOLLS MFG. CO. Ottumwa, Iowa

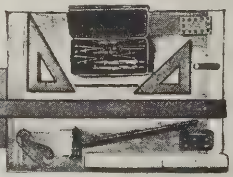


WHITE'S IMPROVED LEVEL

Shipped on Approval

Our No. 2011 improved level, illustrated herewith, is especially designed for work where a general purpose level is required. Telescope is 12" long with magnifying power 25 diameters and is capable of detecting an error of 1/16-inch in 300 ft. We ship this level out on approval, express prepaid, in order that you may try it out on your own work before deciding to keep it. Ask today for your circular X and special net price sheet. Ask today!

DAVID WHITE COMPANY
Dept. B, 419 E. Water Street Milwaukee, Wis.



DRAWING OUTFIT, $3.75

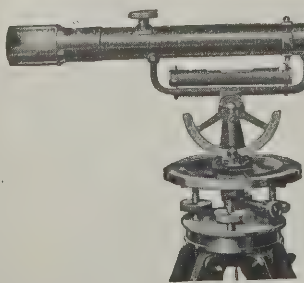
Complete, Regular $6.50, Special to Introduce Ourselves to Building Age Readers

Every Carpenter or Builder should have an outfit like this on hand. This outfit can be used for **Designing Any Job You Have,** from a chicken house to a skyscraper; useful to have around buildings while in course of construction.

OUTFIT consists of Board, T-Square, Triangles, Fine Set of Instruments, Scale, Tacks, Pencils, Rubber, Curve, etc. **Money back if not satisfactory in any way.**

We make a specialty of complete Outfits for the Carpenter and Builder, Architect, etc., with and without Drawing Tables. We make everything ourselves and sell direct. Our prices do not average over half the usual retail price. Send for complete catalogue W FREE. Remember we guarantee our tools in every way, and we refund money if buyer is not entirely satisfied or can duplicate our $3.75 special under $6.50 or our other outfits at proportionately higher prices. **Write at Once, NOW, Don't Delay**

The T-Square & Triangle Co., Baldwin Bldg., 3 2 Clinton St., Newark, N. J.



The Yankee (A Compound Level)

Just the thing for the Arch.-Builder
An accurate level for moderate cost

Runs Horizontal and Vertical Angles.

Sold guaranteed by

Frost-Adams Co.

37 Cornhill, Boston, Mass.

Write for our catalogue of books for Carpenters, Builders, Architects, etc.

COPPER CABLE SASH CHAIN

Thomas Morton
245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS

CHAINS

For Suspending Heavy Doors, Gates, Etc.

All of SUPERIOR QUALITY

CHAMPION METAL SASH CHAIN

Window Frames 87c

Overstocked. Your opportunity. Seven carloads of Frames ready for shipment. Made entirely of **Clear Soft Oregon Fir,** practically all vertical grain. Outside Casings, **1⅛ inches.** Drip Cap Head. **Cost less than the raw material to make them. Guaranteed quality.**

Prices for regular 2-light Check Rail Window Frames range from 87 cents for 12x20 to $1.54 for 40x30, 2-light. Sale is limited to the stock on hand. Send for Special Frame Circular NOW.

BUSTED PRICES

Big Sale on Nails - $1.85

10,000 kegs of genuine galvanized wire Nails will outlast all other kinds. Put up in regular kegs. Price per keg of 100 lbs., as follows:

10 pennyweight, $1.85. 8 pennyweight, $2.05.
6 pennyweight, $2.10. Shingle Nails, $3.00.

Also 5,000 kegs of Nails, mixed all kinds in a keg; good assortment, handy to have around your workshop. During this sale only, **per 100 lbs. $1.38. Order by Lot CP-1100.**

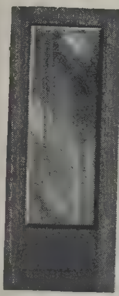
"Oregon"

$3.65

Size 2 ft. 8 in. x 6 ft. 8 in. 1⅜ inch thick Glazed Clear D. S. **A. Glass.**

No. 10-C.P.-381
Pacific Coast Fir—the coming Wood. Low Price and High Quality Combined.

2-10x6-10	.$4.25
3- 0x7- 0	. 4.70



"Washington

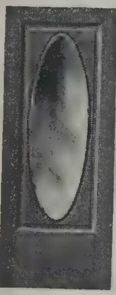
$4.30

Size 2 ft. 8 in. x 6 ft. 8 in. 1⅜ inch thick Glazed Clear D. S. **A. Glass.**

No. 10-C.P.-378
Made of Pacific Coast Fir. Hardwood Value at Soft Wood Price.

2-10x6-10	.$5.05
3-0 x7-0 .	5.35

Extra for Bev. Plate Glazing.



"Pacific"

$5.90

Size 2 ft. 8 in. x 6 ft. 8 in. 1⅜ inch thick. Glazed Clear D. **S. A. Glass.**

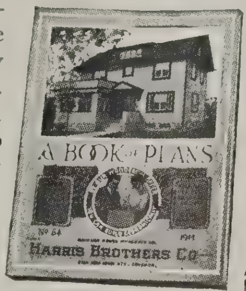
No. 10-C.P.-390
Clear Fir can be finished to imitate Oak, Birch and other hardwoods. Any finish—Stain, Oil or Paint.

2-10x6-10.	$6.65
3- 0x7- 0.	7.00

Best Quality House Paint 95c per Gal.

Our paint department is under the personal supervision of Mr. V. Michaelson, for 30 years the foremost paint man in America. His picture has appeared on over 8,000,000 cans. Paint of quality is his specialty. Every gallon has our strongest guarantee. Our Ready Mixed Barn Paint at 56c. a gallon will outlast any similar paint produced.

$10,000 Plan Book Free



Our new 1914 edition is just off the press and now ready for distribution. Every builder should have a copy. 130 pages handsomely illustrated, photographic reproductions, floor plans, complete prices, etc. A most comprehensive volume. Too valuable to give away indiscriminately, but sent FREE to any contractor-builder or any person interested in building. Full of practical suggestions. Fill in coupon below.

Also send for our Building Material Catalog No. 103.

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CHICAGO. Our main plant, yards and millwork warehouse—Everything ready for immediate shipment.

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SEATTLE. Pacific Coast stock—Fir Timbers, Dimension Red Cedar Siding and Shingles—all kinds of lumber. Quick shipment; low freight rates for Western territory.

You must send us your inquiry at once and get our guaranteed DELIVERED prices.

OUR GREAT 1914 OFFER

Here is the Greatest Sale ever advertised—the opportunity you have long sought for—a chance to buy staple lumber and building material—Roofing, Wire, Fencing, every kind and description, in fact, Merchandise of every nature, at unheard of low prices.

We have determined that the year of 1914 is going to be the Banner year in our great lumber department. We have on hand 20,000,000 feet of high-grade lumber suitable for the construction of Buildings, no matter for what purpose intended. Come to our great yards in **Chicago** and let us show you this stuff actually in stock.

We can also ship you direct from our **Pacific Coast** and **Southern Kiln Drying** and storage Yards. No other concern in the world has a more complete stock of everything needed to build.

SEND US YOUR LUMBER BILL

You can order a complete carload of material from us, including everything you need to construct and equip and we will ship it to you, WITHOUT ONE CENT CASH IN ADVANCE.

All we want to know is that the money will be paid us as soon as the material is received, unloaded and checked up.

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We furnish complete Blue Print Plans, Specifications and Material List free for any of the building designs shown in our Book of Plans providing the material is purchased from us, or upon receipt of $2.00 as deposit, we will send for examination, a complete $50.00 set of Plans, Specifications and Descriptive Material List. Money will be refunded if plans are unsatisfactory.

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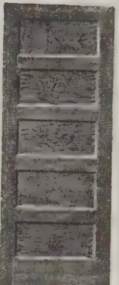
We maintain a special department of personal service for the individual builder. We develop building ideas and make plans to order to suit any requirements. We employ building experts who are thoroughly familiar with all kinds of construction. They are men of experience in actual building, constantly at your service, ready to give expert advice and dependable information.



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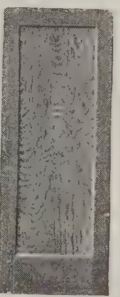

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BACKED BY $10,000,000 CAPITAL AND SURPLUS

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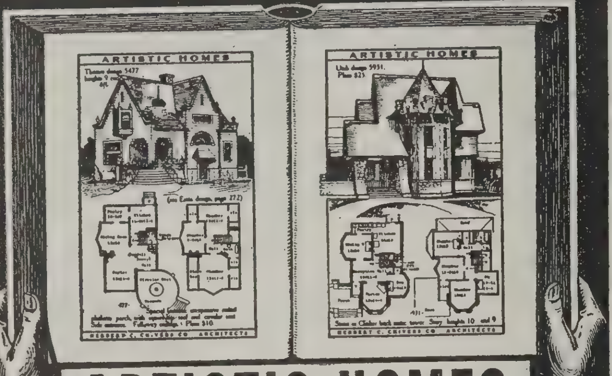

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great satisfaction to the people of the house by reason of its fine operation when the temperature outside was 24 degrees below zero.

New York Central Iron Works Company, Box 223, Hagerstown, Md., states that the Dunning steel boilers for steam or hot water heating are now in use in 30,000 buildings throughout the country and that over 1000 are in use in Army Posts of the United States Government.

The Sandusky Portland Cement Company, Sandusky, Ohio, makes announcement that on February 13 of the present year a decree was entered in the United States District Court for the Northern District of Illinois declaring the Newberry patent No. 851,247 to be good and valid and that the McCormick Waterproof Portland Cement Company and S. T. Sjoberg infringed that patent and are perpetually enjoined from making or selling waterproof cement or carrying on the process described in said patent and that the complainant shall recover the damages resulting from said infringement. Suits against other infringers have been commenced.

The Ideal Concrete Machinery Co., Cincinnati, Ohio, has some very interesting literature that should be in the hands of every building contractor in the country. The "Ideal Ideas," volume 13, No. 3, gives a clear description and illustration of the general line of concrete mixing machinery, moulds, forms, etc., that this company manufactures. Volume 13, No. 1, is filled with information about concrete generally and machine mixed concrete particularly that is likely to be of advantage to all who read it. Volume 13, No. 7, has an interesting story of "Two Boys from Osgoode," and tells how these two boys, the Boyd Bros., built up

(*Continued on page 116*)

BEST-OF-ALL ROOFING
HEAVIER BY 5 LBS. TO THE ROLL THAN ANY OTHER SMOOTH ROOFING MADE
BEATS WOOD SHINGLES

WEARS BETTER THAN SHINGLES
BEST-OF-ALL READY ROOFING
RUBBER FINISH ON BOTH SIDES

$2.25 a Roll for 80-Pound Slate Surfaced Roofing

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Catalog No.	Surfaced With	Price, per Roll	Shpg. Wt., Roll, Lbs.
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48BA362	Crushed Greenish Gray Slate.......	2.25	80

$1.80 60-Lb. Rolls

Prices of Guaranteed Best-of-all Roofing.

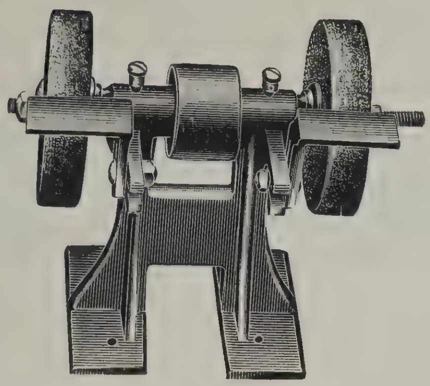
Catalog No.	Thickness	Weight, Pounds	Width, Inches	Rolls Contain, Square Feet	Will Cover, Square Feet	Guaranteed to Wear	Our Price
48BA331	1½-Ply	40	32	108	100	7 Years	$1.25
48BA332	2½-Ply	50	32	108	100	10 Years	1.50
48BA333	3½-Ply	60	32	108	100	12 Years	1.80

Prices of Guaranteed Flint Surfaced Roofing.

Catalog No.	Thickness	Weight, Pounds	Width, Inches	Rolls Contain, Square Feet	Will Cover, Square Feet	Guaranteed to Wear	Our Price
48BA318	1 -Ply	50	32	108	100	5 Years	$0.95
48BA316	1½-Ply	60	32	108	100	7 Years	1.20
48BA315	2½-Ply	70	32	108	100	9 Years	1.45
48BA311	3½-Ply	80	32	108	100	12 Years	1.75

$1.75 80-Lb. Rolls

Sears, Roebuck and Co., Chicago, Ill.

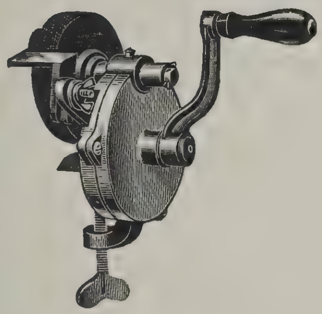


Perfection Grinders

This new design Belt Driven Grinder will do the work of a grindstone 20 times faster. It is specially designed to operate with gasoline engines—direct or line shaft drive.

All Bearings capped and babbitted. Oil brass cups, convenient adjustable tool rests—

Carborundum wheels 7 x 1 inch, one coarse, one fine. Pulleys 3 x 2 inches. Costs $10.00.



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Write for our illustrated booklets—better still send us an order.

Star Specialty Mfg Co.

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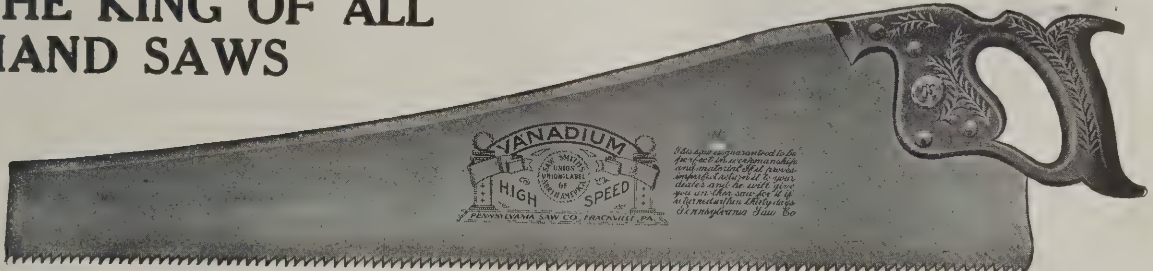
THE KING OF ALL HAND SAWS



Straight or Skew Back, in Hand, Panel, Ship Carpenter or Rip, Any Teeth Desired. All Sizes.

The Vanadium High Speed Guaranteed Hand Saw

We guarantee they will hold a keen cutting edge longer than a saw made from any other steel.

The steel in this saw is very close, tough and ductile and can be perfectly tempered. This insures against chance of kinking or fracturing the teeth while setting and gives permanency to the cutting edge.

SPECIAL OFFER

When VANADIUM STEEL SAWS are bought DIRECT FROM FACTORY by the carpenter, at the following prices, delivered to any Post Office in the United States,

16″	18″	20″	22″	24″	26″	28″	30″
$1.45	$1.55	$1.60	$1.75	$1.90	$2.00	$2.25	$2.50

we will agree to file, set and put them in cutting condition **six** times within six months from date of purchase, WITHOUT COST, provided the saw is MAILED TO THE FACTORY and the purchaser sends us the amount of parcels post charges for the return of the saw.

If new handles are required send 25 cents in addition to parcels post charges for return of saw. We will put them on the saws. **Saws will be returned the same day they are received by us.**

Approximate parcels post charges on 18″ to 26″ saws

Within 150 miles of Factory,	6 cents each way
Within 300 miles of Factory,	8 cents each way
Within 600 miles of Factory,	11 cents each way
Within 1000 miles of Factory,	14 cents each way

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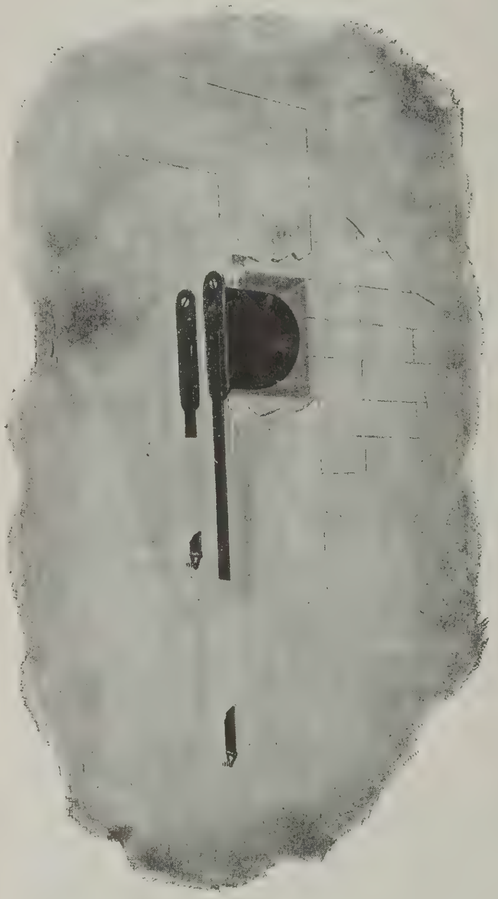

Unit Sash Balances

An Architect from Scottsville, New York, informs us that the Pullman Sash Balances he installed 20 years ago are still giving perfect service.

"The windows have been in constant use," and he adds, "this is a pretty thorough test of the durability of Pullman Sash Balances."

We cannot give you better proof that it would pay you to Pullmanize your Windows.

Every Unit Sash Balance is guaranteed for 10 years. They work smoother, look better, last longer, and cost less than unsightly cords and noisy weights. Write for our handsome book "Modern Windows."

Pullman Mfg. Company
8 Industrial St., Rochester, New York

a profitable, permanent business, and shows some of the work they have completed. A letter or post card addressed to the Ideal Concrete Machinery Co. will bring any of these booklets that the reader may desire.

The Huber Builders' Material Company, 48 and 50 Vine Street, Cincinnati, Ohio, tell in another part of this issue how the building contractor can save money at the purchasing end when securing materials for building construction. The company offers to send free of charge a copy of its catalogue showing a great variety of bargains, also a copy of its 88-page Mantel Book.

Gage Tool Company, Vineland, N. J., is offering to send its self-setting plane on trial to carpenters and builders who conform to the conditions set forth in the circular which can be obtained on application.

Mechanics in all trades will be interested to learn that the L. S. Starrett Company, Athol, Mass., has accepted the invitation of the Rice Leaders of the World Association to join that organization. We understand the Association is limited to 50 manufacturers from all lines, and the invitation is extended only to recognized leaders in the various kinds of manufacture.

Universal Portland Cement Company, Chicago, Ill., issued during the progress of the recent Cement Show in that city a 12-page pamphlet describing somewhat in detail the definite purpose of each booth so that visitors might be enabled to study them more effectively. The company had eleven booths at the show and in another part of this issue we present a picture of one of them.

The March issue of "DooR-Ways," the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill., tells how teamwork will accomplish results, whether it be in business or in other fields of labor. Teamwork certainly helps to lift the load, and how this is done in connection with advertising and in promoting business cannot fail to interest many of our readers. This issue of "DooR-Ways" is illustrated with numerous half-tone engravings and its general style of make-up is in keeping with its predecessors. It is accompanied by a card calendar for March, the upper part of which is a panel carrying a picture of the charming young lady who poses so effectively for the series of views appearing upon the calendars sent out by the company. In the present instance she is shown with a hockey stick over one shoulder and a pair of club skates over the other, evidently on her way to the lake or rink for a try at this popular winter sport.

The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.

Sash Chains

Cable Chains

Jack Chains

Manufacturers of "GIANT METAL" Sash Chains

Manufacturers of "RED METAL" Sash Chains, Cable Chains, Jack Chains, Bell Hangers' Chains and Plumbers' Chains. Made in Brass, Copper and Steel.

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We are the ORIGINATORS of SASH CHAIN as SUBSTITUTE for sash cord. In use over thirty years. Capacity of our chain plant 30 miles per day.

THE BUILDING AGE

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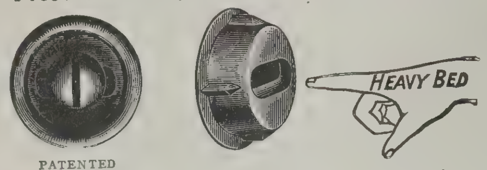
Prevents Drafts, Dust and Window Ratling



The only stop adjuster made from one piece of metal with solid ribs and heavy bed that will not cup or turn in tightening the screw.

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Manufacturers of Builders' Hardware
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TARDEET Is Waterproof

Our Use of It On Parquet Flooring

Has been the result of time, money and experience. We have been making Fine Flooring for twenty years. We make nothing else and can serve you with plain or ornamental, thick or thin, to your satisfaction. Ask for our Colored Floor Plates.

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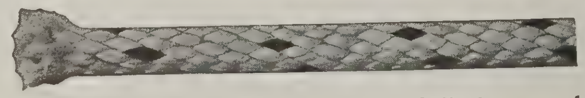

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Samples and full information gladly sent.

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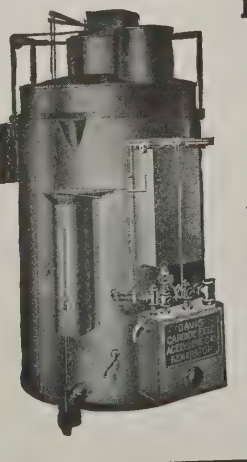
Mr. Contractor and Builder



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Architects desire to recommend the best and we, therefore, invite them to carefully investigate what we have to offer.

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A shingled bungalow of symmetrical design described in the September Building Age.

"One layer of Sheathing and Double-Ply Deafening Quilt is laid over the first rough floor." "The shingles are dipped with Samuel Cabot's Creosote Stain."

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makes floors and partitions sound-proof by breaking up the sound-waves and absorbing them. It makes walls and roof cold- and heat-proof by a cushion of minute dead air spaces that prevents the conduction of heat. From 28 to 50 times as efficient as cheap building paper.

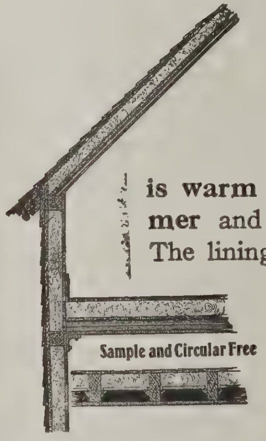
CABOT'S CREOSOTE STAINS

were also used on the shingles and trimmings of this house, giving beautiful and lasting coloring effects and preserving the woodwork. The original and standard stains for shingles and all exterior woodwork.

You can get Cabot's Stains and Quilts all over the country. Send for samples and names of nearest agents.

SAMUEL CABOT, Inc., Mfg. Chemists
BOSTON, MASS.
1133 Broadway, N. Y. 24 W. Kinzie St., Chicago

A House
LINED WITH
MINERAL WOOL



is warm in winter, cool in summer and is **thoroughly deafened.** The lining is vermin proof; **Mineral wool checks the spread of fire and keeps out dampness.**

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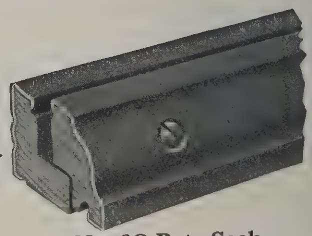


No. 80 Petz Sash

The air comes under the sash and flows up through the vents behind the glass, preventing frosting and sweating of the window.

This sash, like all Petz store-front material, is made of genuine red cypress with a heavy gauge copper drawn over it on both outside and inside. The glass rests in the wood and is kept from the grip of the metal, preventing cracking by the unequal expansion of metal and glass.

Full particulars of the ventilated sash and all Petz bars will be found in our booklet on Metal Store Front Construction. Send for it.

Detroit Show Case Co., 483 West Fort St., Detroit, Mich.

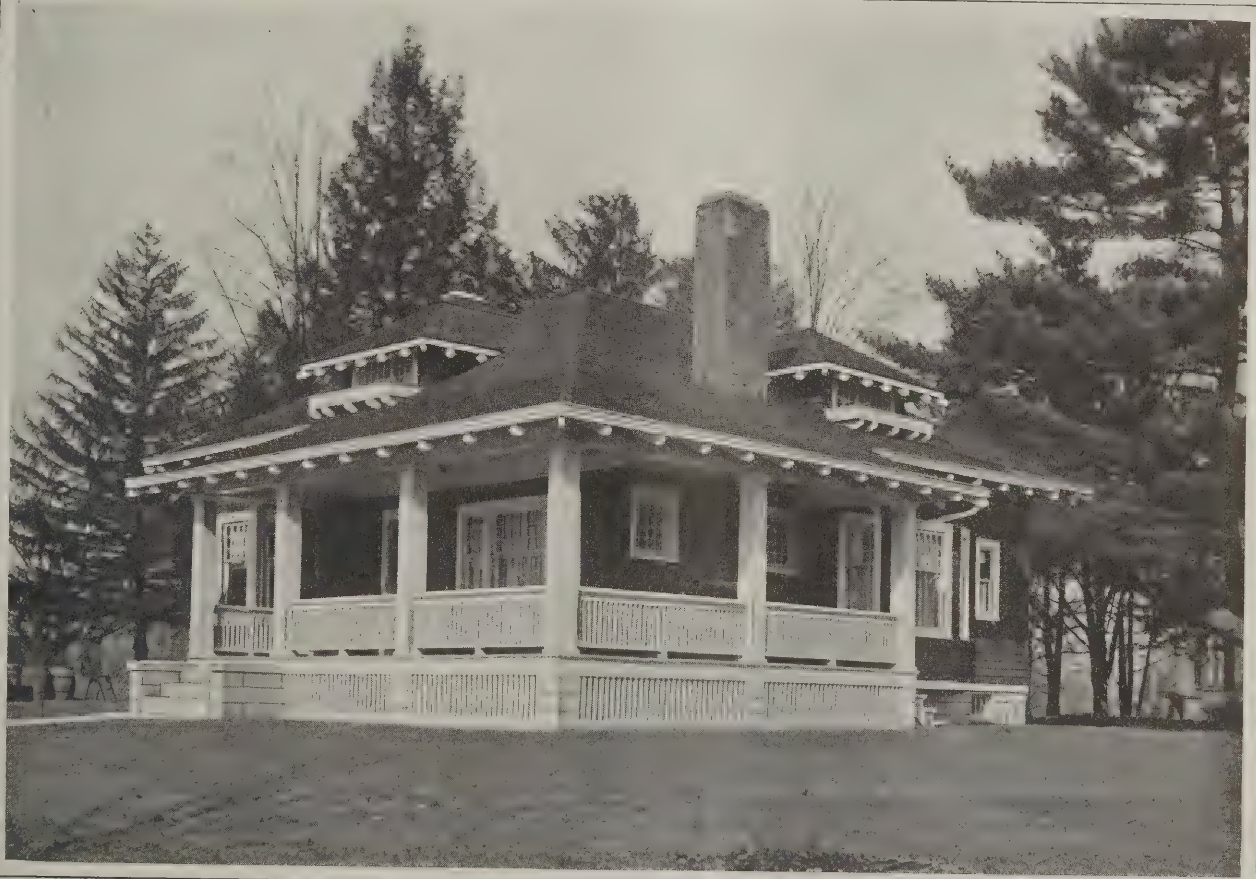
THE BUILDING AGE

NEW YORK, MAY, 1914

A Bungalow for Permanent Occupancy

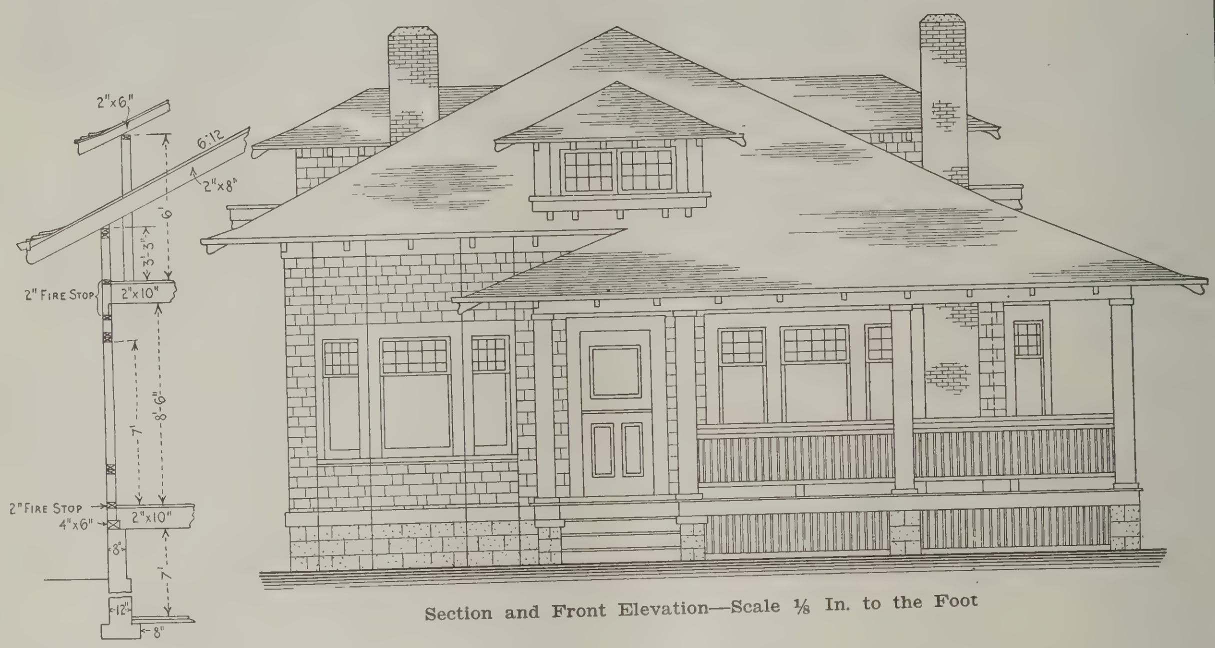
The Moss Green Roof and White Trim Form a Striking Contrast with the Brown of the Main Story

THE bungalow which forms the basis of the present article has been designed with a view to occupancy the year round, and in its exterior treatment it combines its architectural beauty of graceful lines with durability and convenience of arrangement. The roof is hipped and broken by dormers on each side, giving a pleasing effect. It is stained a soft, moss-green, against which the white of the trim on the dormers and gutters stands out in good contrast. The gutters instead of being of the ordinary round bottomed type are shaped to resemble a crown moulding, and give a smart appearance.

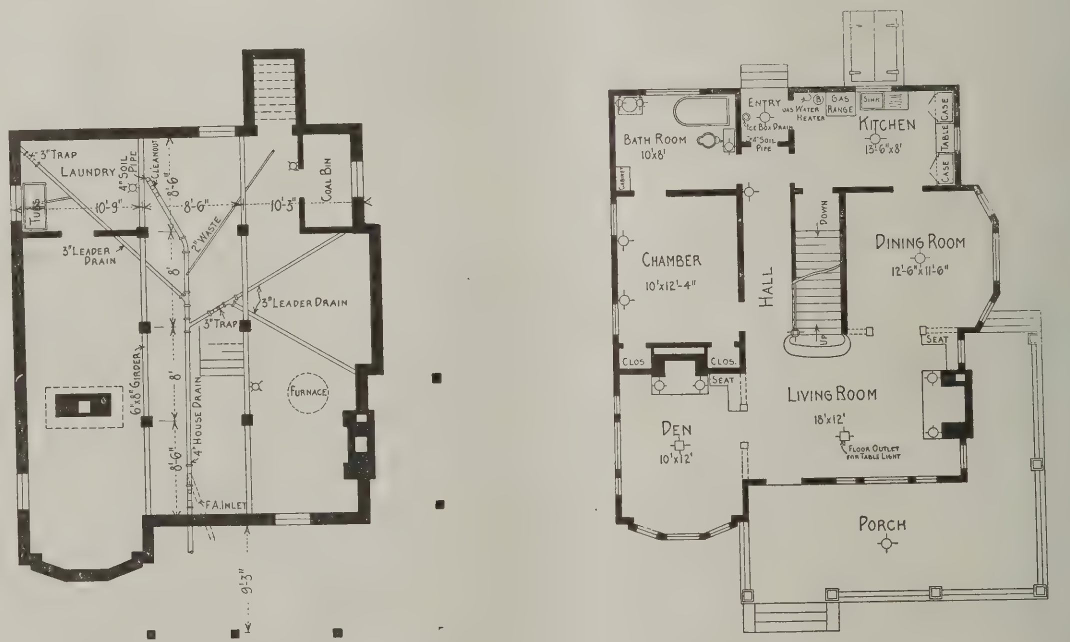


A Bungalow for Permanent Occupancy—Charles E. Anderson, Designer, White Plains, N. Y.

The body of the house is stained a rich weathered brown with Cabot's Creosote Stain, its heavy color being properly subdued by the effect of the white trim and exposed rafter ends. The heavy white columns of the porch give strength to the design, and produce an effect which is often lost by using columns of small diameter. The windows are an essential part of the general scheme and have the upper sash divided into small lights, approximately 6 in. square. The windows in the upper part of the house have casement sash opening inward and are well set off by the flower boxes in front of them.



Section and Front Elevation—Scale ⅛ In. to the Foot



Foundation Plan—Scale 1/16 In. to the Foot

Main Floor Plan—Scale 1/16 In. to the Foot

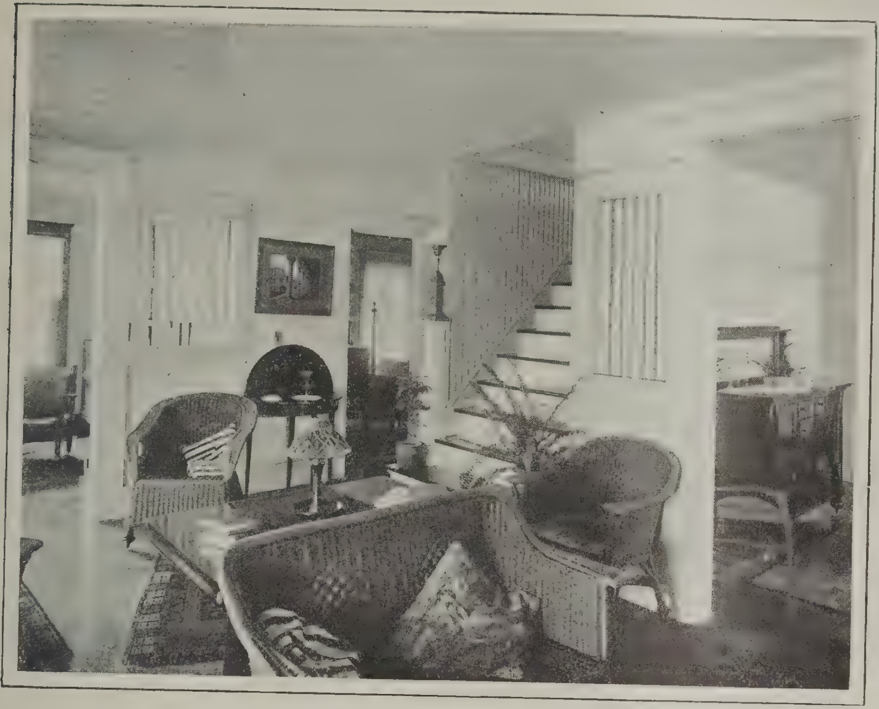
A Bungalow for Permanent Occupancy—Elevation and Plans

The foundations are of concrete blocks, pointed up with black mortar. The front steps are monolithic concrete, as are also the rear cellar steps. The cellar is provided with a concrete floor, and is partitioned to provide space for a laundry and coal bin. The house drain is under the cellar floor, a cement-filled pit being provided for the house trap. Branches lead to the drain to accommodate the flow from each leader pipe, a cleanout trap being placed between main drain and branches. The first floor is supported by two 6 by 8-in. girders.

The first floor plan shows an entrance directly into the living room, the latter having a triple window in the front, the center frame of which is 3 ft. 8 in. wide by 5 ft. 2 in. high. The mullions separate this from two windows with openings 1 ft. 8 in. by 5 ft. 2 in. high. At the side of the room on each side of the large fireplace is a small window, 2 ft. square divided into small panes.

The fireplace is of textile brick, laid in black mortar and contrasts beautifully with the trim of the room, which is done in white. The stairs rise from the rear of the living room, and are white with mahogany treads. There are no handrails, but square spindles run from the steps to the ceiling, as shown in the detail. The newel post is plain.

From the living room the den is entered through a columned opening on each side of which there is a fretwork of spindles of a design similar to those on the stairs. Thus the living room and den, though separately defined, are practically one room.



A Bungalow for Permanent Occupancy—View in Living Room, Showing Dining Room at the Right, the "Den" at the Left and a Glimpse of the Bedroom in the Immediate Background Just Beyond the Main Flight of Stairs

The den is trimmed with North Carolina pine, finished in Flemish oak. The room might be said to be all windows so far as the outside walls are concerned, since there are two triple windows—one in front and one on the side of the room.

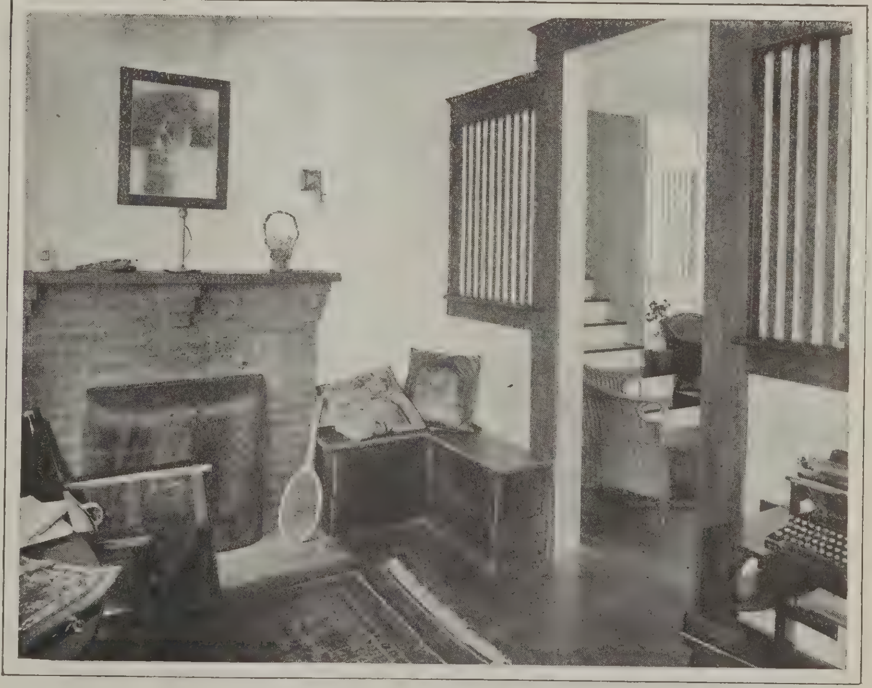
At the end of the den opposite the front window there is a fireplace of fracebrick, laid in red mortar. This has a heavy shelf in Flemish oak, the brickwork being corbelled out at ends and middle to form brackets which support the shelf.

The trim in this room, as in the rest of the house, is in Colonial style, the casings being plain, with no milled grooves or wall mouldings. This does away with the objectionable difficulty of cleaning grooved woodwork, and also gives the wood a chance to show its grain, which is so often lost in a mass of grooves and moulded work. The floor of the den as well as the living room and dining room are of oak.

The dining room opens from the living room through an opening of similar design, although somewhat wider, as that leading to the den. The dining room is finished in white and has a plate rail, the walls beneath the plate rail being divided into panels by 2¾-in. strips. The outside wall of the dining room forms a bay, having a window 4 ft. wide and 5 ft. 2 in. high, and two narrower windows 1 ft. 8 in. wide. These windows follow the scheme of the others in having the upper sash divided into small lights. Opposite the living room opening a double-acting door opens into the kitchen.

The kitchen is 8 by 13½ ft., and is provided with a case or built-in cabinet. The lower part of the cabinet has doors opening into a space for pots and pans, etc. Above these doors are drawers for knives, forks and silver, and just over the drawer on one side is a moulding board which slides in or out, with a bread board over the opposite drawer. Between these two sets of doors and drawers there is a flour bin. Over the flour bin a built-in table receives the light from a window just above it.

The kitchen is provided with a gas range, to which is connected a gas hot-water heater. As an auxiliary to the gas water heater a pipe is run to the Richardson & Boynton hot-air furnace in the cellar, and while the furnace is in operation the water is heated by a pipe coil in the firebox. A porcelain enamelled sink and drainboard are set in front of the rear window, where there is plenty of light. The kitchen trim is North Carolina pine. From the kitchen a flight of steps descends to the cellar. These are also handy from the hall which runs forward to the living room, and are reached by a hall door, also giving access to that end of the kitchen. A rear entry provides



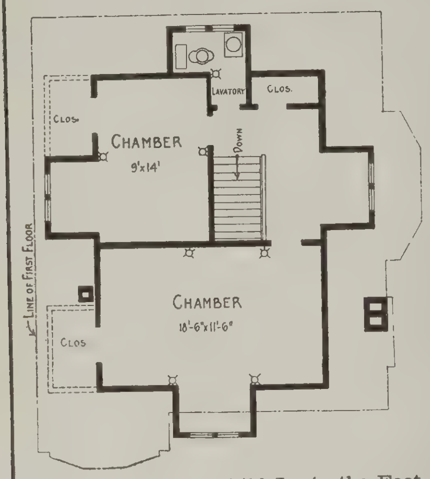
A View of the Fireplace Corner in the "Den" and the Living Room at the Right a place for a refrigerator and is fitted with a drain for that purpose. From the entry doors open to the kitchen and hall.

Across the hall from the kitchen is the bathroom. It is provided with a tile floor and wainscot and has one large casement window.

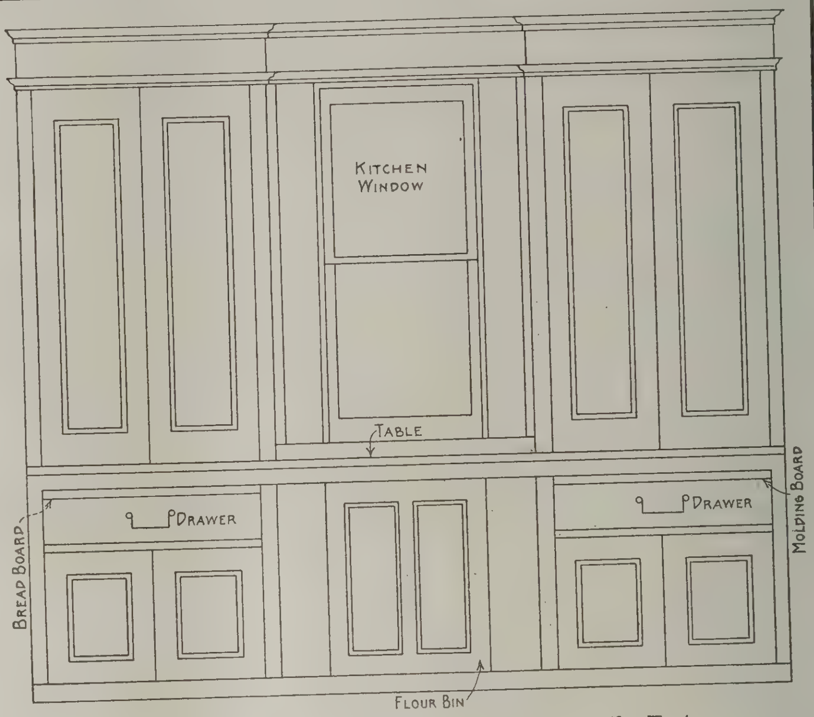
The bathroom is exceptionally large and roomy, being 8 by 10 ft. The tub and basin are porcelain enamelled and the tank solid porcelain, the seat being birch mahogany. A medicine cabinet is built in and has drawers underneath for towels, etc. The woodwork is white.

The master's bedroom is on the first floor and connects with the bathroom. The trim in this room is finished in white and all the furniture used is mahogany. There are two closets, with space between for a bureau. The floor in this room is finished with comb-grained North Carolina pine.

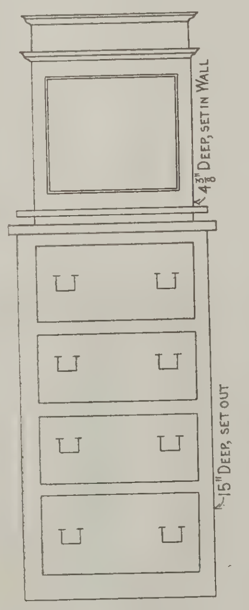
The chimneys are provided with vitrified tile flue lining and a good furnace draft is assured by using 8 by 12-in. flues. The chimneys are capped with Portland cement concrete. The hearths are supported on concrete, the forms being cut in between the floor joists. The bathroom floor tile are laid on a concrete base, the tops of the joists being trimmed to a V-shape, with the edge below the surface of the concrete.



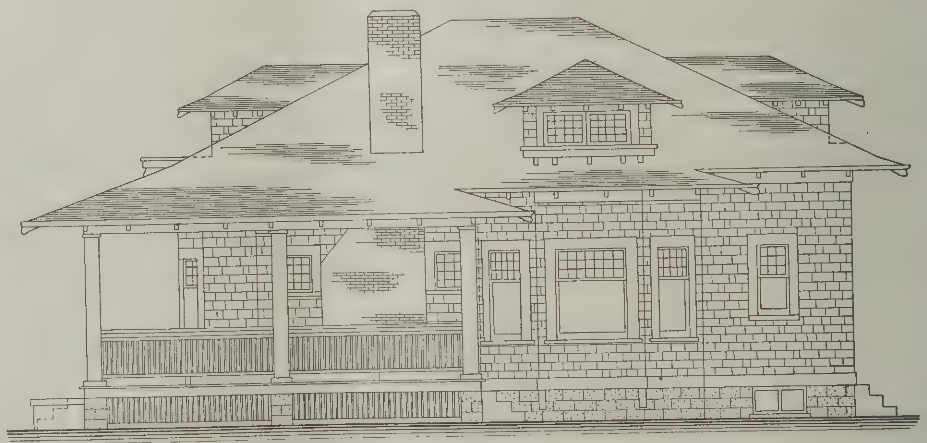
Attic Plan—Scale 1/16 In. to the Foot



Details of Kitchen Cupboard—Scale ½ In. to the Foot



Elevation of Bathroom Cabinet—Scale ½ In. to the Foot



Side (Right) Elevation—Scale 3/32 In. to the Foot

A Bungalow for Permanent Occupancy—Plan, Elevation and Miscellaneous Details

The fire places are provided with smooth cemented ash chutes to the cellar, with ash traps in the center of the back hearth, through which the ashes can be swept directly into the chute and disposed of below. These chutes are fitted with cast-iron doors in the cellar. Covert throats and dampers are built into the fireplaces. These serve to shape the fireplace throat and regulate a draft, and also help to support the masonry work above.

The upper floor has two rooms and a lavatory. In the hall is a good-sized closet which can be used for linen. Each room has a closet extending under the slope of the roof.

The dormers opening on the roof have casement windows opening inward. These are 4 ft. wide by 2 ft. high. The floors in the upper story are No. 2 North Carolina pine. The trim is North

Carolina pine, finished in Colonial style, varnished.

All inside doors are cypress, with five cross panels. The front door is Dutch style, so that the top can be opened without opening the lower part.

The girders supporting the building are three pieces of 2 by 8-in. timbers spiked together, all joints being made over piers. Joists are of spruce, 2 by 10 in., spaced 16 in. on centers, and bridged once in every 8 ft. Ceiling joists and rafters are 2 by 6 in., spaced 24 in. on centers. Studding is 2 by 4 in., spaced 16 in. on centers.

A Bungalow for Permanent Occupancy—The Flight of Stairs Leading Up from the Living Room, with a View of the Dining Room Beyond

The Dining Room, Looking Toward the Front of the House Across the Living Room

The exterior framework is sheathed with $\frac{7}{8}$-in. planed tongue and grooved North Carolina pine boards, free from all loose knots, and covered with resin sized building paper. The porch ceiling is finished with North Carolina pine ceiling. The porch columns and all exterior trim are of cypress. The porch flooring is Oregon fir.

All interior finish, where painted, is white wood, and where varnished or stained North Carolina pine is used. Roof shingles are red cedar and side shingles are white cedar. Double studs are provided at all angles and openings, and joists are doubled under all partitions. Headers and trimmers are doubled. The roof is covered with shingles dipped 10 in. in Cabot's Creosote Shingle Stains and laid on shingle lath.

All joints in cast-iron pipe are calked with oakum and lead. Horizontal branches in soil pipes and waste pipes have a fall of at least $\frac{1}{4}$ in. to the foot. Joints between galvanized iron pipes and lead pipes are made with brass ferrules wiped to the lead pipe and screwed to the iron. Vent pipes and hot and cold-water pipes are of the best quality galvanized iron. All branches at sinks and basins are extended for air vents.

The street water main is connected with the house supply by a 1-in. galvanized-iron pipe, provided with a stop and waste cock in an accessible place in the basement. From the stop cock branch lines are run to the bathroom and kitchen fixtures.

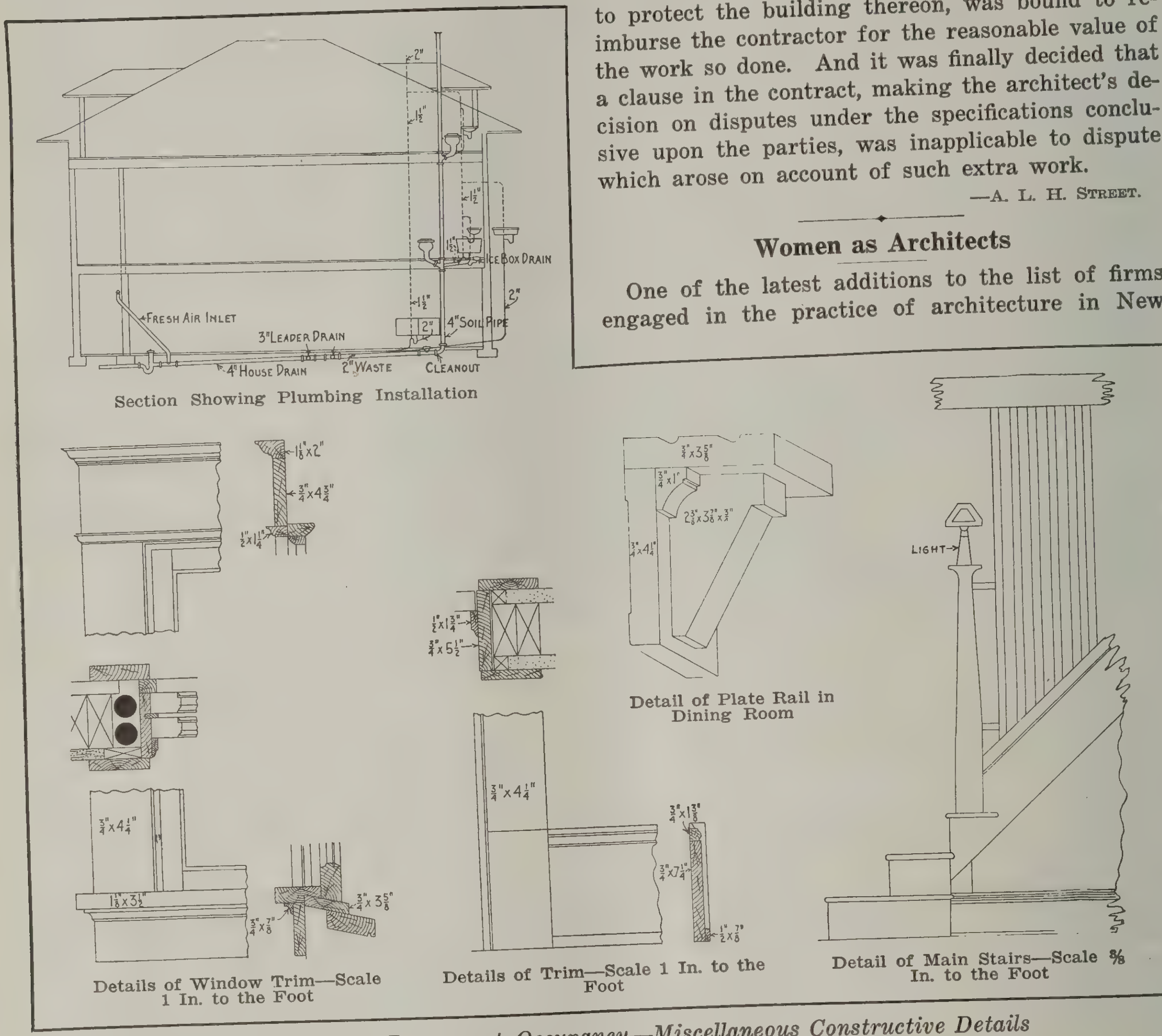
The hot-water system is provided with a circulating pipe from the boiler to the kitchen and bathroom fixtures, insuring hot water as soon as the faucet is turned on. An extra heavy 40-gal. boiler is provided. The wash trays in the basement are two-part Alberene, 24 by 48 in.

The house is wired for electricity, all work being done according to the rules of the Board of Underwriters, single pole switches being provided with faces finished to match other hardware, controlling lights in living room and dining room, one at top of main stairs controlling upstairs hall light and at top of cellar stairs controlling cellar light, and one in the living room controlling porch light.

All exterior trim is painted three coats of white lead and oil, as are also the leaders and gutters. The interior trim in dining room, living room and downstairs bedroom is painted three coats of flat white. The den is stained Flemish oak with

Bridgeport Standard Penetrating Stain and Wax Finish, applied as a one-coat finish.

This bungalow was built for Maurice F. Duhamel, of Poughkeepsie, N. Y., and was designed and erected by the Charles Everett Anderson Company, 37 Liberty Street, New York City, and Depot Square, White Plains, N. Y.



Section Showing Plumbing Installation

Detail of Plate Rail in Dining Room

Details of Window Trim—Scale 1 In. to the Foot

Details of Trim—Scale 1 In. to the Foot

Detail of Main Stairs—Scale ⅝ In. to the Foot

A Bungalow for Permanent Occupancy—Miscellaneous Constructive Details

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Contractor's Duty to Adjoining Landowner

A clause in a building contract, providing "The contractor shall do all that is necessary to protect the adjoining buildings, streets and the public during the excavation, doing all shoring and bracing, and trenching required to this end," was recently held by the California Supreme Court, in the case of Alta Planing Mill Company vs. Garland, 138 Pacific Reporter 738, not to place upon the contractor the duty of going upon the adjacent property and putting supports beneath the foundations of the building thereon, he being merely required, as provided by the California statutes, to use ordinary care to avoid disturbing the support of adjoining buildings. The court also holds that no duty devolved upon the contractor to underpin an adjoining building, by reason of the existence of an ordinance requiring persons in excavating to support and protect adjoining buildings from damage.

As a result of these conclusions, the court finds that the owner of the building in course of construction, having ordered the contractor to construct certain improvements on an adjoining lot to protect the building thereon, was bound to reimburse the contractor for the reasonable value of the work so done. And it was finally decided that a clause in the contract, making the architect's decision on disputes under the specifications conclusive upon the parties, was inapplicable to dispute which arose on account of such extra work.

—A. L. H. Street.

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Women as Architects

One of the latest additions to the list of firms engaged in the practice of architecture in New York City is that of Mead & Schenck, both members of which are women. Miss Mead obtained her education mainly in the Department of Architecture at Columbia College, while Miss Schenck acquired her knowledge of house building in Paris. Although this is the first partnership formed by women architects they are not the first women to practice architecture in the city.

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The approaching demolition of the notorious Tabard street area, says the London "Chronicle," reminds one of the clearing away of another famous slum—the Rookery of St. Giles—which was pulled down in the forties for the construction of New Oxford street. It largely consisted of lodging houses where men and women were accommodated at 2d per night, and was the resort of thieves and coiners. Many of the houses were connected together by roof, yard and cellar in such a way that the apprehension of a criminal was an almost impossible task. In some of the passages traps were set which landed a determined pursuer into a cellar or cesspool.

The Quantity System of Estimating

Great Need for Reform in Methods of Estimating—Causes of the Great Differences in Builders' Estimates

By Leslie H. Allen

THE need for reform in our methods of estimating is being felt in a greater or less degree in accordance with the amount of work at present put in by different contractors in their competitive figures. There are still many contractors who are content to estimate by taking the cubical contents of a building and figuring it at the same price per foot cube as some similar building which they have bid upon, and these would not appreciate or use quantities if they had them. On the other hand, there are those who go to a deal of labor in very carefully computing the quantities of brick work, concrete, flooring, framing, etc., and between these two extremes there are many methods of estimating. When we add to this the very many different types of plans that we receive to figure, ranging all the way from the carefully drawn engineers' plans with every dimension indicated, to the sketch plans that are sometimes gotten out by the owner himself on which we are supposed to be able to accurately estimate, there can be no wonder that a wide variation exists in the prices bid on construction work.

Causes of Disparity in Estimates

In a general way it may be said that the causes of the great differences in estimates are due to:

First. Underestimating the unit costs.

Second. Difference of opinion as to what is a fair profit; and

Third. Inaccurate estimating of quantities.

Probably the third is the one factor which causes greater differences than any other.

It cannot be denied that in any one building there cannot be more or less than a certain quantity of masonry, of carpentry work, plastering, etc., and no matter how carefully or carelessly the competing builders may scale their quantities, this quantity of work has to be put in. Why, then, should contractors be first asked to compete against each other in computing the quantities of material they have to furnish? They do not have to guess as to the size of the rooms they have to build or the hight of the ceilings, as these are all determined for them.

Quantities of Material Shown on Plans

Surely it should be the duty of the party who is furnishing the plans to supply in addition the quantities of material shown. It is assumed that if plans are properly drawn it is an easy matter for a contractor to schedule the quantities of work contained in the proposed building. But the fallacy of this assumption lies in the fact that no contractors' estimator, be he ever so expert, can thoroughly understand in one week or ten days the plans which another man has drawn, and probably taken three or four weeks or longer to prepare, and, in consequence, he has to guess on points that are doubtful to him, sometimes guessing too much and sometimes the reverse.

Before any system of quantity surveying becomes established in this country, it will be necessary for those interested to establish some definite standard of measurement and units of measure on all classes of construction work. The methods of measurement are as widely divergent as the methods of estimating and pricing. Some plasterers do not deduct any openings at all, some deduct half openings, and some deduct the full openings. Many masons double the corners and do not deduct stone work. Others measure their brickwork absolutely net. Some plumbers count just the fixtures and the main runs of pipe, while others count up every fitting on each pipe, and this list of differences could be indefinitely extended.

There are many difficulties ahead of the establishment of a quantity surveying system in this country, but I believe that if all those interested will work together for the common end and in a systematic manner the end desired will be achieved sooner than at present appears probable.

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Building in India

Building operations in India have hitherto been noted for undue cost and unwieldly construction in many particulars. For instance, the Taj Mahal Hotel, the largest in India and one of the most recently built in Bombay, required nine years to construct and cost $1,330,000, notwithstanding the great cheapness of native labor. Steam power was used for pumping out the foundations, grinding mortar and for cutting up scantlings, but the sawing of logs and every other kind of work was carried out by manual labor. Lifts or elevators were established on the completion of the building but all the material of construction was raised even to the top of the dome, either by manual winches or on the heads of coolies who walked up and down very steep gangways of rough bamboo. There were no woodworking machines employed except a circular saw.

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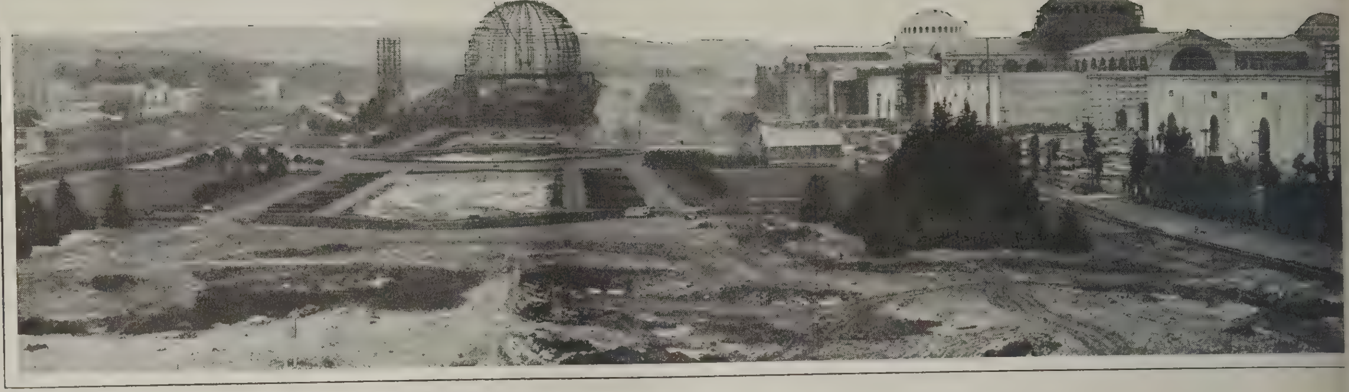
According to the Prussian Act of July 15, 1907, the consent for the erection of buildings and alterations of the same is to be refused when the general appearance of the streets or public places of a city or village is greatly disfigured thereby.

◆

More than 120,000,000 board feet of timber was given away by the government last year to settlers and miners living in or near the national forests.



Progress of Panama-Pacific Exposition

Panoramic Pictures Indicating the Condition of Various Important Buildings Early in March

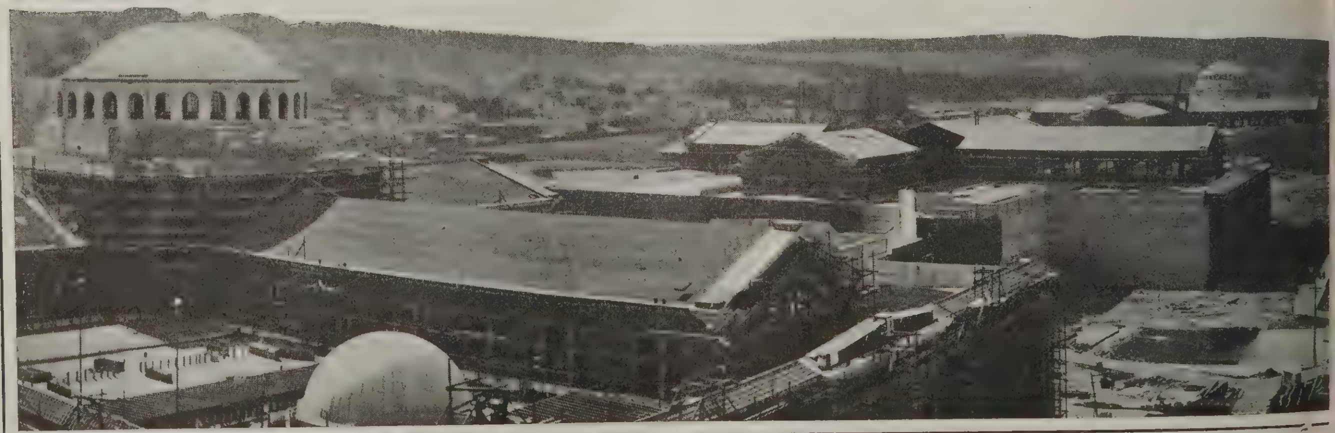
As the time for the opening of the magnificent Panama-Pacific International Exposition in San Francisco draws near interest in the progress of the work takes on a keener aspect and for the purpose of showing our readers the state of the work on the more important buildings early in March we present herewith reproductions from panoramic photographs, the one at the top of the page representing a view from the south gardens, while the picture at the bottom of the page, taken from the top of the Palace of Machinery, completed several weeks ago, is looking toward the Golden Gate.

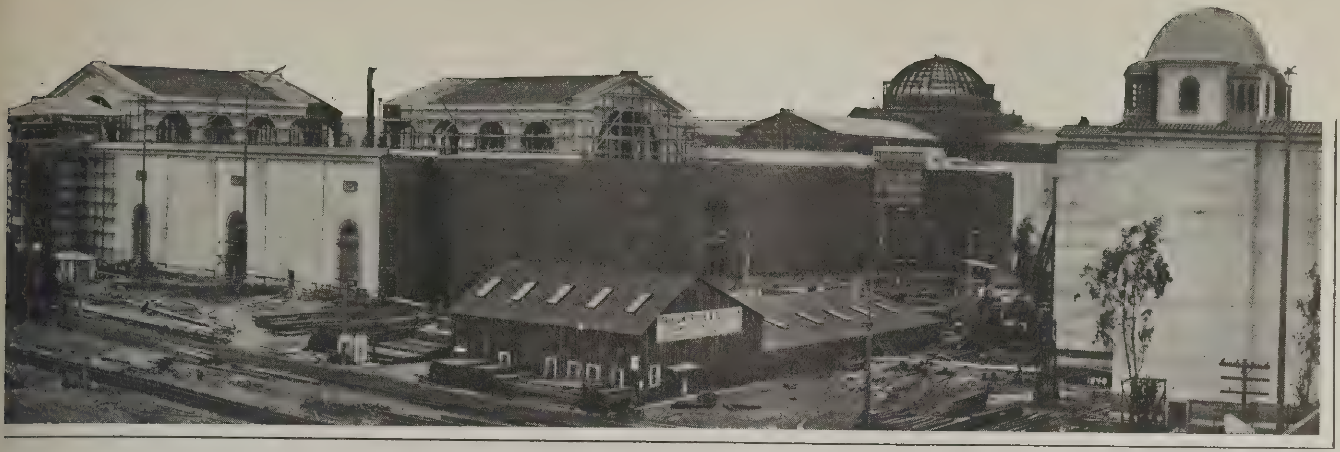
The view extending across the top of the page shows a part of the main exhibit section. The large group of buildings seen clustered on the right lie between the south gardens and the elaborately landscaped marine boulevard on the shores of the harbor. The exhibition lies in a great natural amphitheatre encircled on the south, east and west by the hills of San Francisco and the wooded slopes of the Presidio, part of which are seen in the background.

The large steel frame seen in the center of the gardens is that of the dome of the huge Palace of Horticulture, the dome being 186 ft. high and 152 ft. in diameter. When completed it will be covered with glass and at night colored search lights will play upon the glass from within, giving the dome the effect of a gigantic soap bubble sparkling and iridescent in all the colors of the rainbow. In the foreground and directly in front of the Palace of Horticulture is seen a portion of the south gardens which will be marvels of tropical transplanting.

The large group of buildings on the right consist of eight exhibit palaces, four of which face on San Francisco harbor and four of them border upon the south gardens. The buildings facing the south gardens and forming a continuous east and west façade are, left to right, the Palaces of Education, Liberal Arts, Manufactures and Varied Industries. The palaces facing the harbor are those of Food Products, Agriculture, Transportation and Mines and Metallurgy.

The large white dome at the left is that of the Palace of Education, the dome measuring 160 ft. in hight and 100 ft. in diameter. The dome at the right of this and of similar proportions but which had not been painted when the picture was taken, is that of the Palace of Liberal Arts. Next behind the dome of this Palace may be seen the dome of the Palace of Food Products; the next building to the right and prominent in the picture is the Palace of Manufactures on which the dome has not yet been superimposed. The cross naves in this palace





at the intersection of which the dome will be placed are 110 ft. in hight. The next dome seen is that of the Palace of Transportation and at the extreme right of the picture appears one corner of the Palace of Varied Industries.

In the opening in the center of the group and to the right of the first two domes will be located the huge Tower of Jewels which will rise in superb terraces to a hight of 433 ft. The tower will be cleft by an archway 125 ft. high through which visitors will enter from the main gates of the Exposition into the court of honor, the Court of the Universe.

The panoramic picture at the bottom of the page gives another view of the main group of eight exhibit palaces, all of which at the time the picture was taken were more than 75 per cent. completed and all of which it is expected will be finished before the first of July.

To the left in the picture is the Palace of Varied Industries and in its rear the Palaces of Manufactures, Liberal Arts and Food Products with its completed dome. On the right of the central dividing avenue are the Palaces of Mines and Metallurgy, in the foreground, Transportation, and Agriculture. In the central foreground may be seen the Court of Abundance, which will represent the development of the earth; in the center the Court of the Universe, in which will be a sunken garden capable of seating 10,000 people; to the rear of that the Court of Four Seasons, and directly behind that some distance will be the Palace of Fine Arts, which will be a permanent monument to the Exposition.

In the background to the right may be seen the portals of the far-famed Golden Gate and to the extreme left the residence district of San Francisco.

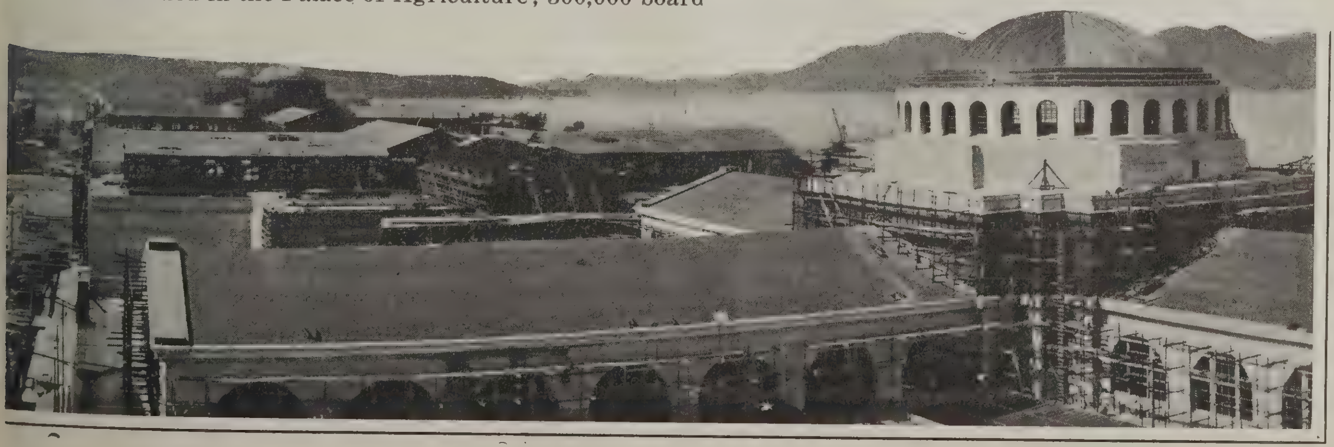
In is interesting to note that during the month of February 600,000 board feet of lumber were installed in the Palace of Agriculture; 300,000 board feet of lumber in the Palace of Food Products; 715,000 board feet in the Palace of Mines and Metallurgy; 300,000 board feet in the Palace of Liberal Arts; 500,000 board feet in the Palace of Manufactures; 836,000 board feet in the Palace of Transportation and 650,000 board feet of lumber in the huge Palace of Horticulture.

Original and brilliant works of sculpture have been completed and are ready for installation on the huge exhibit palaces and in the vast Exposition courts. Thousands of trees, shrubs, and flowers have been introduced from far corners of the world. The horticultural and floral display in magnitude, variety and beauty will probably excel any one of its nature ever presented at a world's exposition.

Building in Sydney, Australia

The number of buildings erected in the metropolitan area of Sydney, New South Wales, last year was 9,284, involving an expenditure of $31,007,733, as compared with 8,862 buildings in 1912 costing $26,438,380. While the number of buildings erected last year constitutes a record for the city, official reports state that the demand for houses is still much greater than the supply.

The plans of seven buildings each exceeding 100 ft. in hight have been approved in the Sydney metropolitan police district by the chief secretary in accordance with the terms of the Hights of Buildings Act. A new building to cost $750,000 has just been designed by Architects Robertson & Marks for erection on the corner of King and Castlereagh Streets. The same architects have also designed an office building to cost $400,000 for the Perpetual Trustee Company.



A Brick Garage, Stable and Greenhouse

A Combination of Red Brick and Stucco Walls Which Form a Contrast with the Red Clay Tile of the Roofs

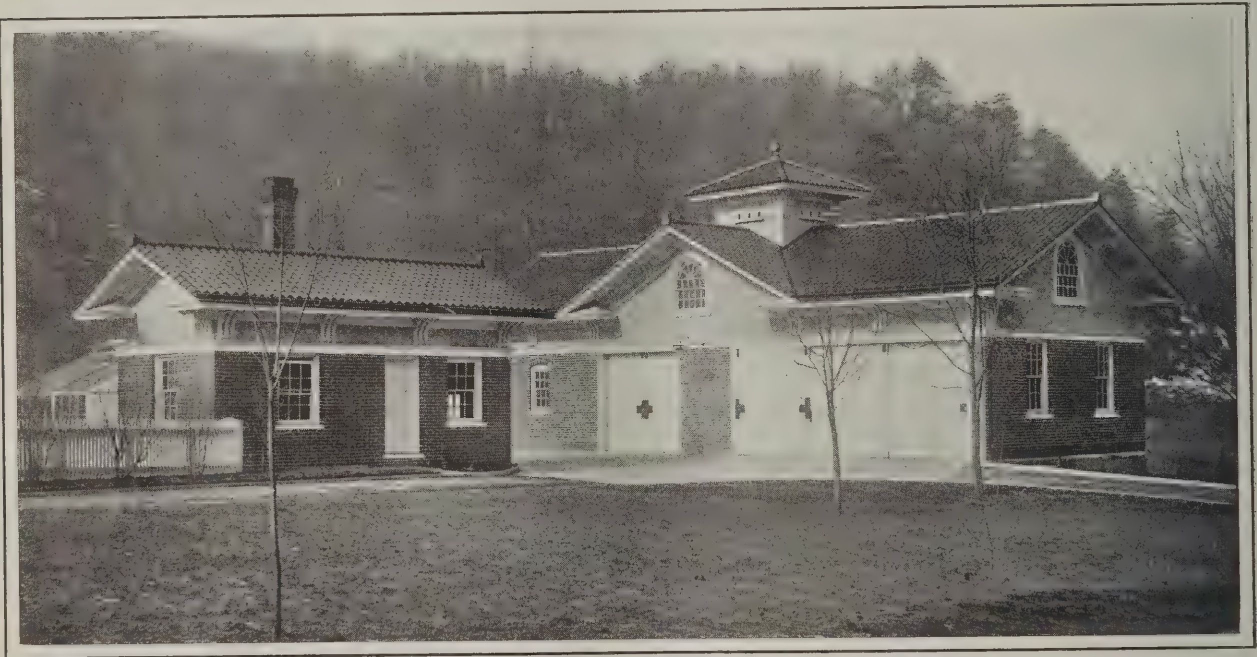
IN the study presented upon this and the pages which follow the garage, stable and greenhouse are linked together in a way to produce a most pleasing effect while at the same time giving due consideration to convenience and economy. While this particular layout was designed to suit a very large, odd shaped suburban lot and provide for a larger range of housing space than the average person might perhaps require, the combination is such that it may be expanded or reduced according to individual preference.

For example, the entire greenhouse may be omitted and the other group will present a satisfactory appearance without it. Another change which could be made is to omit the stable end of the building or a portion of it but retaining the gables and cupola in the center of the structure, or simply build the garage with provision for two cars, or even one. Every person keeping an automobile should provide a place to take care of a friend's car when visiting him.

If changes are made the cornice should be reduced to suit the size of the building. As a rule the great trouble with a low building of this nature is to produce that artistic pleasing effect on the outside which will combine with the residence and grounds surrounding it, after accomplishing what is desired in the way of floor space. With the style of building here presented such a difficulty would seem to be eliminated.

The structure shown in the halftone engraving upon this page is situated on the top of a small hill with a circular driveway marked "A" on the plan, and leading to a pair of handsomely finished concrete gate posts, then out into the boulevard. This roadway has a uniform grade of about 3 per cent. and is 10 ft. wide, built with concrete gutters and curb on each side and having the center crowned and macadamized. The other roadway, marked "B" on the plan, is built in the same manner and leads to the *porte cochere* of the owner's residence, from which it circles back into the road "A" just above the big gate.

The garage, stable and greenhouse are constructed of red brick to the top of the windows and from this point to the cornice are finished with stucco. A wood cornice is used, copper valleys and Ludowici-Celadon Company's red clay tile for the roofs. All woodwork is painted pure white.



General View of the Greenhouse at the Left and of the Garage, Carriage House and Stables at the Right —Architect, S. C. Pace, Covington, Va.

The rafters are 2 x 6 in. placed 16 in. on centers and are covered with sheathing boards laid close.

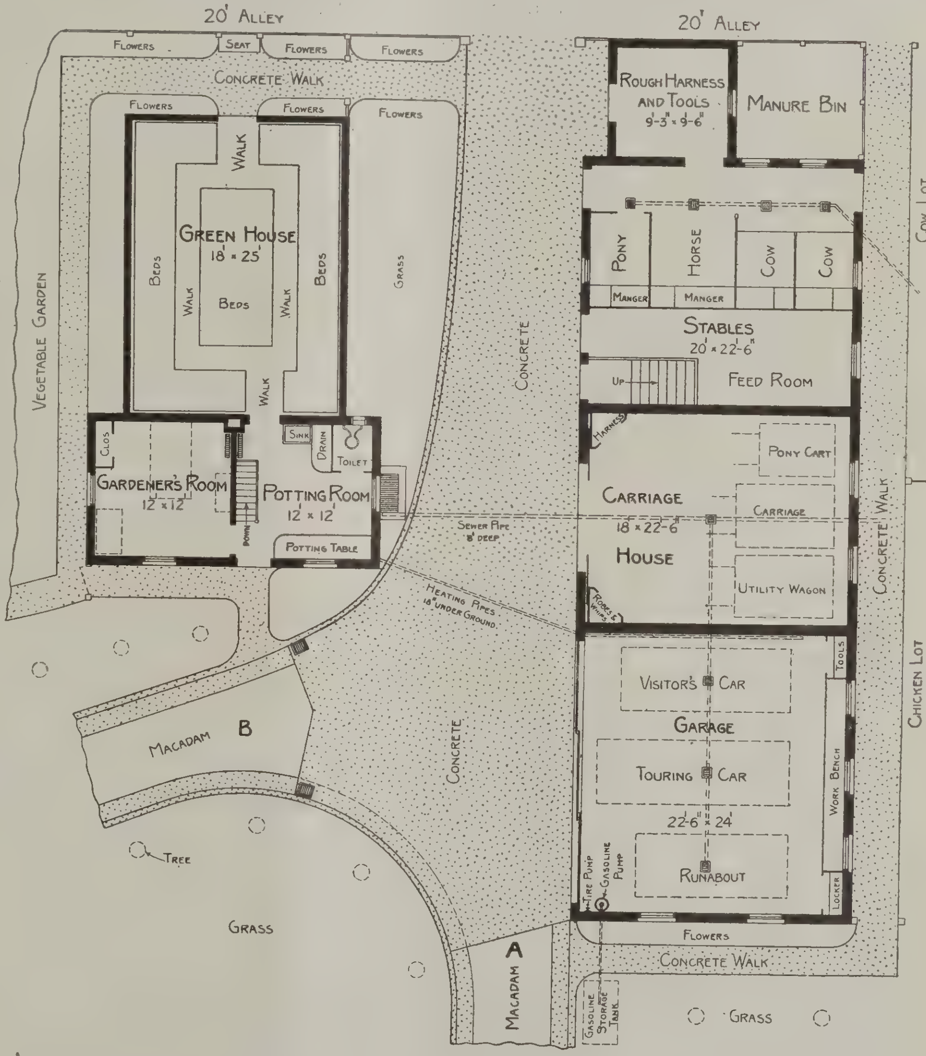
All studding used in the building are short, so 2 x 4's were utilized, placed 16 in. on centers. These were storm sheathed and where stucco is shown on the elevations ⅜ x 2-in. furring strips were nailed to support the expanded metal lath carrying the stucco which shows above the brick work.

All the floors are well drained and trapped. Under every foot of the cement work on this job 5 in. of coal cinders were used, rammed very hard after sprinkling them. Then 3 in. of concrete, mixed in the proportions of 1:3:5, were laid on, finishing with a 1-in. wearing surface made of a mixture of one of cement to two of "stone-meal." This stone-meal, it may be stated by way of explanation, consisted simply of the screenings from crushed limestone. Use was made of everything that would pass through ½-in. mesh-wire net, and after the water rose and settled the finer part of the mixture was sprinkled; that is, there was screened out a small quantity through a 14-mesh screen, and it was mixed half and half as a dryer before troweling. The result was a very pretty piece of work. Furthermore, it is impervious to water, owing to the fact that there is so much mealy substance in the screenings.

The architect states that he has put in this kind of work for several years without the slightest defect thus far making its appearance. No sand is used at all except in the 3 in. of concrete base. The architect says that freezing does not affect it in the least when coal cinders are used underneath as a bed, while at the same time it will withstand the heaviest kind of hauling over it. The only thing to be watched is "check," or roughen the surface whenever the grade exceeds 2 per cent., as the surface is always very hard and compact.

Another View of the Buildings Showing Drive Leading to the *Porte Cochere* of the Owner's Residence

The stalls in the stable have 2-in. white pine over the concrete floors, as this makes it much better for the stock than standing directly on the concrete.



Block Plan Showing Arrangement of Buildings—Scale 1/16 In. to the Foot

A Brick Garage, Stable and Greenhouse—Designed by S. C. Pace, Architect, Covington, Va.

The cow stalls are made the necessary length and are elevated 3½ in. above the concrete floor.

In the garage provision is made for three cars. This takes care of the two cars now kept by the owner and provides space for a visitor's car which is a very good thing whether one maintains one or two cars or even if he keeps none at all, as he frequently has a friend visiting him with a car which should be taken care of along with his entertainment.

The special features of the garage, however, are, first, the doors are arranged so that either car can be run in or taken out by simply shoving the door back from that particular space; or, any two doors may be opened at once as they are hung on three sets of track at the top and have three sets of steel guides at the bottom which not only make the doors work easily but shut out the cold and dust. Richards-Wilcox hangers and bottom guide are used.

In the next place the Bowser gasoline storage tank just outside the building may be filled from the tank wagon without driving an inch out of the road or the man stepping on the grass, and yet the run of pipe into the building is very short and direct. The Bowser pump just inside the garage is out of the way in every respect and yet it is always conveniently at hand when required for use. This storage tank has a capacity of about 300 gallons, which takes care of from one to fifteen barrels, according to the preference of the owner, thus giving him a chance to stock up when gasoline is low in price or when a shortage is anticipated.

Another point is the abundance of sun and artificial light, both of which are under perfect control. The work bench, tool case and locker, the position of each of which is clearly shown on the plan, are all noticeable features.

In the next place, the cement pavement in front of the building has a fall of one-quarter of an inch to the foot from the building to the drains under the road and provision is made for washing any vehicle without the operator getting into either mud or water. The flooring under each car in the garage is also drained to the center and has an anti-freezing water connection so that either car can be washed inside the building if desired without wetting the floor under the other car. The stable has separate drainage from the garage and the entire building is cut off from the garage by solid partitions so that no ammonia odors can get from the stable to the automobiles.

Finally, the garage is heated by hot water from an American Radiator Company's "Ideal" boiler in the basement under the potting room of the green house by a double line of 2-in. pipe encased in 3-in. pipe under the pavement, as indicated by the dotted lines on the plan and connected to 2-in. coil pipes on the partition wall, as shown by the dotted lines in the garage. This heat has proven entirely satisfactory and so comparatively little is required that it is not missed from the greenhouse. By thus heating the garage whenever it is possible to do so one not only eliminates the necessity of draining the radiator every time the car is used, but preserves the finish on the body and upholstering, as well as keeping the batteries in good shape.

The greenhouse, which is of the type built by the King Construction Company, North Tonawanda, N. Y., is so located that it receives the direct sunshine throughout the entire day and at the same time forms the end of the vegetable garden, thus combining many attractive features with the uttermost convenience.

The chickens and cows are shut off entirely from the front of the building as well as from the lawn and vegetable garden, and yet they are where they get the best of attention without interfering with anything else.

The line of water pipe to the greenhouse and garage was taken through the center of the garden where several hydrants are placed at convenient points. The line was also extended to several points over the lawn where sprinklers are installed, thus enabling the gardener to take care of both the garden and the lawn with very short pieces of hose.

The buildings were erected on the grounds of William A. Luke, which are located in Rosedale, a suburb of Covington, Va.

The plans were prepared by Architect S. C. Pace, 428 West Main Street, Covington, Va.

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The Forest Service is compiling a volume table for calculating the board contents of standing yellow pine trees in the southwest. It is based on actual measurements of 6,000 trees.

Heights of Buildings in Manhattan, N. Y.

In connection with some very interesting statistics which have just been prepared by Rudolph P. Miller, Superintendent of Buildings for the Borough of Manhattan, N. Y., there is shown the number of the buildings of different hights called for by the plans filed with the department in 1913. A noteworthy feature is not only the great decrease in the number of skyscrapers as compared with 1912 but also the greater decrease in the proportion of skyscrapers last year. Only 15 buildings over 12 stories in hight were projected or 3½ per cent. of all the new buildings for which plans were filed, while in 1912 there were 33 buildings over 12 stories in hight or practically 6 per cent. of the total.

From the figures compiled it is shown that the average hight of all the buildings is only 5.4 stories, a fact which Superintendent Miller believes will come as a surprise to most people. Tenements constitute half of the buildings from 7 to 12 stories, and about 40 per cent. of all the buildings over 6 stories high. The average hight of the proposed tenements is 6.6 stories. About half of the fireproof tenements are 12 stories high and most of them are located in the West Side section.

The following table shows the hights of buildings of fireproof and ordinary construction in Manhattan in 1913:

Stories	Fireproof	Ordinary	Total all Classes
1	21	136	157
2	16	37	53
3	14	31	45
4	13	7	20
5	18	68	86
6	18	62	80
7	6	2	8
8	5	—	5
9	14	—	14
10	6	—	6
11	4	—	4
12	33	—	33
13	3	—	3
16	2	—	2
17	3	—	3
20	4	—	4
22	1	—	1
28	1	—	1
52	1	—	1
	183	343	526

What may be regarded as miscellaneous structures and which are included in the grand total here presented are not "buildings" in the strict sense of the term, although they come under the requirements of the Building Code and are therefore listed. They include sheds, coal pockets, temporary reviewing stands, outhouses, etc.

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Some Uses for Loblolly Pine

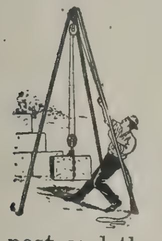
The range of uses for loblolly pine is wide, and it is sold throughout the eastern and central states and exported to Europe and Central America. In building construction, it is used for interior finish, flooring, ceiling, sashes, wainscoting, weather boarding, joists, lath and shingles. It also finds wide use for boxes, slack barrels, cheap furniture, woodenware and toys. In addition, it is used in bridge and trestle work and for freight cars. The wood is very easy to treat with chemical preservatives, and the recent development of wood impregnation processes and plants is rapidly increasing its use for many purposes.

Hoisting Rigs for the Builders' Use—VIII.

The Spanish Windlass and Its Construction—Erecting a Wooden Tower Without Using a Gin Pole

By Edward H. Crussell*

ANOTHER makeshift rig that works something on the principle of the "twister" but more on that of a winch is the Spanish windlass, pictured in Fig. 45 of the sketches. Two sticks or posts and a rope are needed, one end of the rope being made fast to a tree or "deadman" and the other to the load. Two men are required; one holds the vertical post which acts as a drum, while the other walks round and round with the horizontal bar. The rope coils up on the vertical post and the whole arrangement moves toward the "deadman" as the bar is revolved.



Referring again to the millwright and his shaft, the writer has heard of a heavy piece of shafting with couplings and pulleys attached being raised into position in the following manner: Two single ropes were attached to the arms of the pulleys at each end of the shaft and were then taken up and made fast to a beam directly over the position the shaft was to occupy; then by taking hold of the pulleys and rotating them the rope coiled up on the shaft and raised it into place in the manner illustrated in Fig. 46.

The writer has used this same scheme for rolling heavy timbers up an incline, particularly when the help was insufficient or the timbers covered with ice. In these risky conditions the rope acts as a safety device; it gives the men confidence and enables them to stop and catch their breath. Sometimes instead of tying the rope to the timber it is merely passed around it, one end being made fast to something at the top of the incline, while the other is held by a workman who is also at the top of the incline or on the ground at the far side. As the men below roll the timber over this man hauls in on the slack and if necessary snubs the rope around something so as to prevent the timber sliding back again.

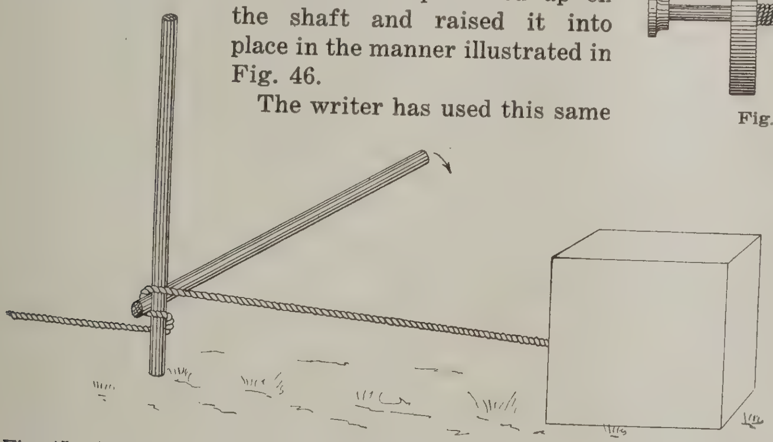


Fig. 45—A Spanish Windlass—An Emergency Rig Made with Two Sticks and a Rope

Hoisting Rigs for the Builders' Use—VIII

Some years ago the writer was erecting a wooden tower to support a water tank. The tower, though heavy, was of simple design, being formed of three equal sized bents, each bent consisting of three posts, cap and sill. All the posts stood plumb and were 12 x 12 in. in cross section; the caps and sills were 12 x 14 in. and stood on edge. The sills were bolted to concrete piers about 2 ft. above the ground and the length of post between cap and sill was 16 ft. 10 in., making the total hight of the tower 21 ft.

A plan view of the lower portion of the tower is shown in Fig. 47 and the side elevation of one of the bents in Fig. 48. Each bent was sway-braced with 3 x 12-in. plank as shown and after the bents were up they were braced to each other in the same manner. This latter set of bracing is not shown in the drawing.

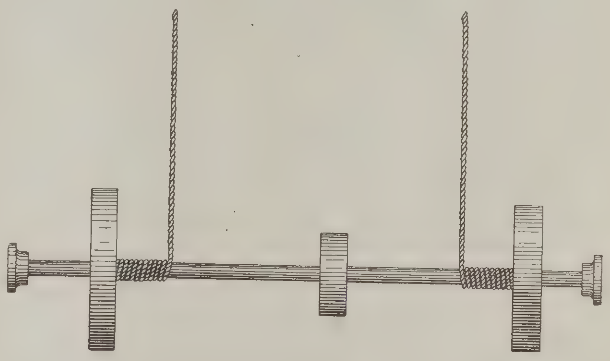


Fig. 46—Method of Lifting a Line Shaft

We had been losing time on this job from the start and as there was no chance of setting up a gin pole without going to a lot of extra work it was decided to erect the tower without one, which we did in the following manner:

We first stood up the end post of the center-bent by main strength and fastened it in place. That does not seem very much to say, but suppose you just get a 12 x 12-in. stick of Oregon fir 17 ft. long and with five men to help you up-end it on top of a sill that is 3 ft. above the ground and see what it feels like. To resume; we stood up one post and after bracing it with some pieces of 1 x 6 in. used it as a gin pole for raising the other end post of the same bent. We tacked a couple of boards across them near the top in order to keep them the proper distance apart and then spiked on two of our long 3 x 12-in. braces, letting them reach from the ground to the tops of the posts, forming a rather steep incline up which we rolled our 12 x 14-in.

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*Copyright, 1914, by Edward H. Crussell.

cap with the assistance of two ropes as described.

The ropes in this case were brought over the tops of the upright posts and the men holding them stood on the ground. Two ladders were laid on top of the inclined braces before starting the cap up them, this being to give the men who were to roll it some sort of a foothold. The entire arrangement is shown in end elevation in Fig. 49.

After the cap was fastened in place we raised the center post of this bent by a tackle suspended from it and then used this center bent to raise the other two which were put together while on the ground. The diary of this job shows that we raised the two posts and cap of the center bent in 25 minutes, which in this location was less time than it would have taken us to erect a pole.

This brings us to the end of our present theme. In the foregoing all of the more common forms of hoisting rigs have been considered and from them the reader with a little study should be able to devise something that will meet his requirements. It is always best to have more than one way of doing a thing because local conditions often change our plans. This week you may use a gin pole for a certain job; next week for the same job in a different locality it may be necesary to use something else; lack of room or lack of material or some other cause over which one has no control, forcing this alternative upon you. In the handling of hoisting apparatus as with everything else "practice makes perfect" and experience brings confidence.

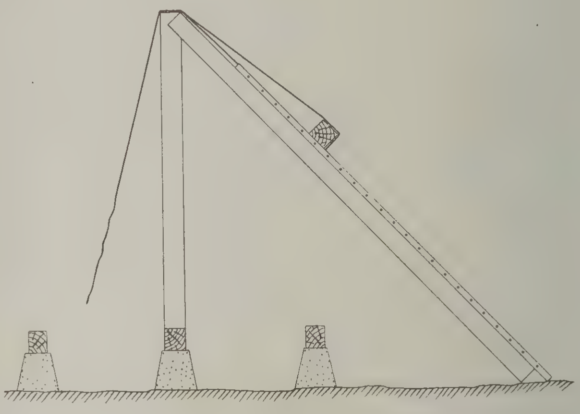


Fig. 49—Method of Raising the Cap into Position

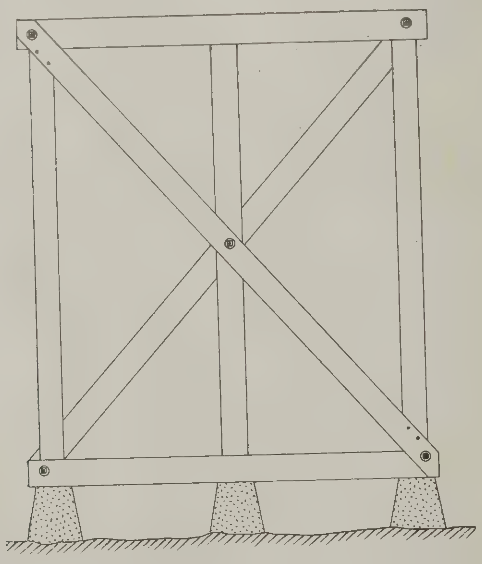


Fig. 48—Side Elevation of Tower, Showing the Framing

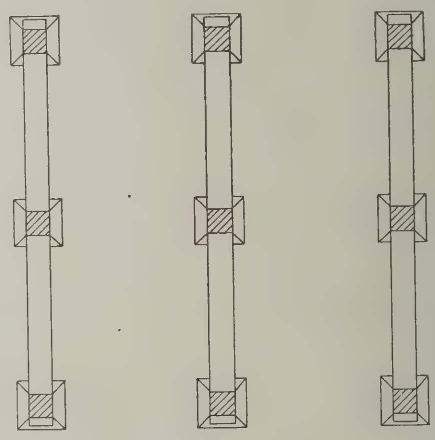


Fig. 47—Plan of Lower Portion of Tower

Hoisting Rigs for the Builders' Use—VIII

Epilogue

If a man who could not swim was working in some position where it was almost certain that he would some day fall into deep water, there would be two courses open for him: He could either quit his job or learn to swim. Now suppose that he is so situated that he cannot quit or perhaps he likes the job so well that he prefers the risk of falling into the water to losing it. Don't you think he ought to make some effort to learn the art of swimming or try to figure out some mode of escape; some plan of action for the emergency when it occurs? He may have a distaste for the water and a horror of getting his hair wet, but that is no reason for acting the ostrich—shutting his eyes to the almost inevitable consequences and trusting to some one else to pull him out of the difficulty when it arrives.

There are many otherwise competent mechanics in this country today who act the part of the ostrich toward some distasteful part of their trade, merely because it does not appeal to them. They never have any shingling to do so are not interested in shingling; they do not like the rough "form" work in connection with concrete and figure the less they know about it the less chance there is for them to be set at this kind of work. They do not like pulling on ropes and are afraid to take the responsibility of arranging the tackle, so they are always very busy with something else when this work is being attempted and allow some one else to get away with the valuable experience that should be theirs. Then one day they get a bit of a boost and suddenly find that their new position calls for all this outside knowledge. They may, of course, do as they did before—trust to some one else for it.

Fellow workmen! If you have passed these articles by because you were not interested in them and this last paragraph catches your eye, try and remember where the information is so that you may be able to put your hand upon it in the time of need. Here's hoping you will not some day fall overboard when the book of swimming instructions has been left at home.

A Country House of Colonial Design

The Kitchen Wing and the Two Chimneys Flanking the Main Walls of the House Are Noticeable Features

THE subject of our cover design this month is a moderate sized house of Colonial design and having as noticeable features the veranda with its stuccoed columns, the well-broken roof lines, the kitchen extension and the two chimneys which flank the walls of the main portion of the house. It will be seen from an inspection of the floor plans upon the facing page that the layout is unique both as regards the location of the several flights of stairs and of the disposition of the sleeping rooms on the second floor. Here the master's rooms are to the front, while the smaller sleeping rooms are across the hall at the rear, the hall running parallel with instead of at right angles to the front line of the building.

Foundations and Timbering

According to the specifications of the architect the foundation walls are of concrete 12 in. thick and composed of one part Portland cement, three parts sand and five parts broken stone.

The first and second floor beams are 3 x 10 in. yellow pine placed 16 in. on centers. The rafters are 2 x 8 in. yellow pine placed 20 in. on centers; the sills are 4 x 6 in. laid flat; the girders are 6 x 8 in. yellow pine and the ridges are 1¼ x 10 in. yellow pine. The house is of the well known balloon frame construction, all frame work clearing the chimneys not less than 1 in. The beams are doubled for all headers and trimmers as well as around chimney and stair openings.

The outside frame is covered with 1 x 10 in. sheathing laid diagonally and over this a layer of building paper, this in turn being covered with 8 in. clapboards. The roof is covered with sheathing boards, building paper and white cedar shingles laid 5½ in. to the weather in regular courses.

The flooring is ⅞ x 2½ tongued and grooved maple. All interior trim is white pine or basswood, except in the kitchen and pantries.

The Plastering and Chimneys

The plastering is three coat work with sand finish for all rooms except kitchens and closets which have a hard white finish. All interior woodwork has three coats of paint ground in linseed oil.

All tin for flashings is painted both sides before laying. Leaders and gutters are galvanized iron, painted.

The house is wired for electricity and piped for gas and has approved switches and cut-out boxes. The dining and living rooms have five-light drop pendants, combination fixtures, and the bedrooms have wall brackets.

The chimneys are of common brick set upon a concrete footing projecting 6 in. on all sides. The 8 x 12 in. flues are lined with burnt flue tile.

The lavatory on the first floor and the bath room and lavatory on the second floor have white tile floors laid on a concrete bed constructed between the floor beams, the rooms being fitted with base and coves.

The plumbing fixtures are porcelain enameled iron of modern pattern with nickel plated fittings and exposed piping.

The house is intended to be heated by hot air furnace with fresh air intake and box leading to the outside. The rooms are to have plain registers in walls or floors according to requirements.

The approximate cubic contents of the house as furnished by the architect are as follows:

Main house 33 x 35 x 25 ft. including cellar	= 28,875 cu. ft.
Extension 14 x 20 x 14 ft. (average hight)	= 3,920 cu. ft.
Total	32,795 cu. ft.

At a unit price of 17 cents per cubic foot the cost amounts to $5,575.15.

Estimate of Cost of Labor and Materials

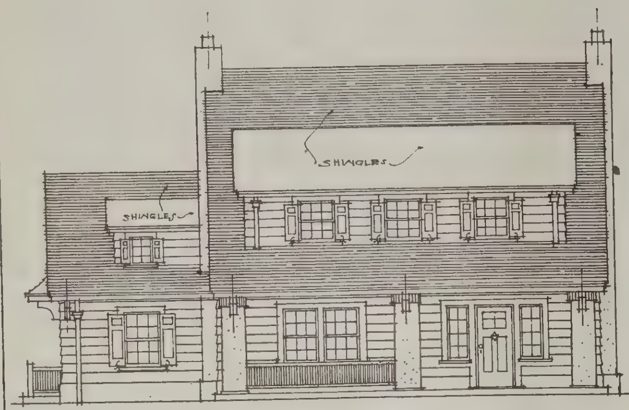
The principle classification of labor and materials is embraced in the following:

Excavating	$110.00
Grading	50.00
Masonry Concrete and cement	520.00
Plastering	355.15
Carpentry and millwork	2,682.00
Painting	320.00
Plumbing	420.00
Heating	350.00
Metal work	120.00
Tile and slate	150.00
Mantels	70.00
Gas and electric work (including fixtures)	370.00
Hardware	58.00
	$5,575.15

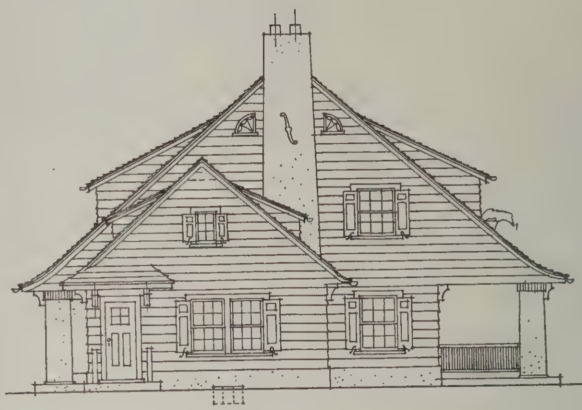
The design here presented is that of Architect Frank T. Fellner, care *The Building Age*, 239 West Thirty-ninth street, New York City, or 413 Caton Avenue, Brooklyn, N. Y.

At a recent meeting of the Sheet Metal Contractors' Association of Cleveland, Ohio, the subject of "System in Business" was interestingly discussed by George A. Rutherford, president of the Builders' Exchange of that city, who explained the system used in his business as a building contractor. Other speakers included Edward A. Roberts, the well known secretary of the Builders' Exchange, and E. H. Boehm of the Industrial Association of Cleveland.

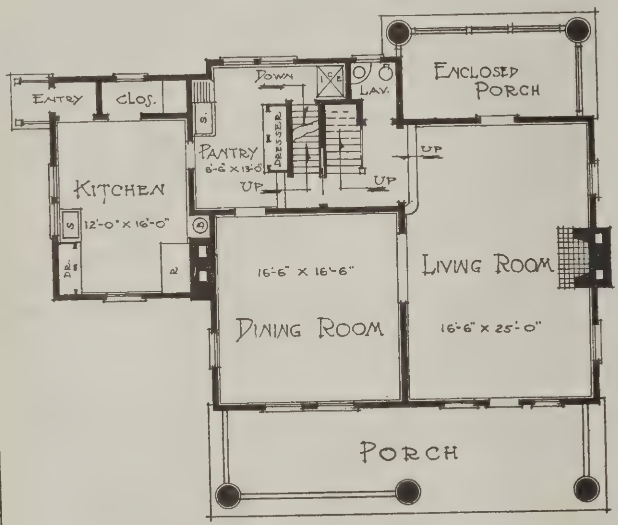
A warehouse to cost $1,700,000 has been designed by Cass Gilbert, 11 East Twenty-fourth Street, New York City, for erection in Kent Avenue, Brooklyn.



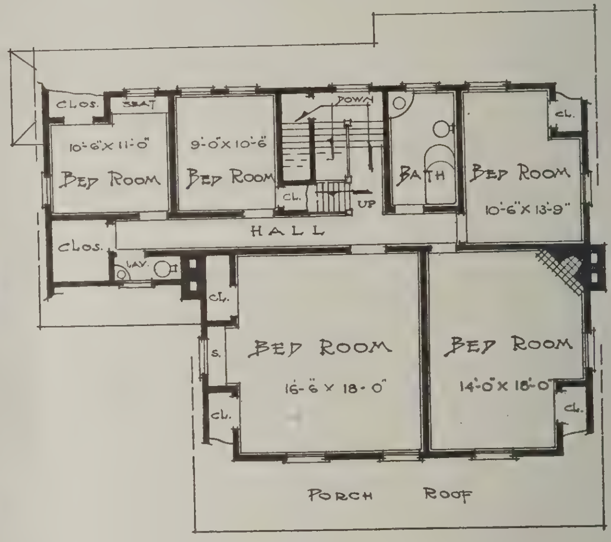
· FRONT ELEVATION ·



· SIDE ELEVATION ·

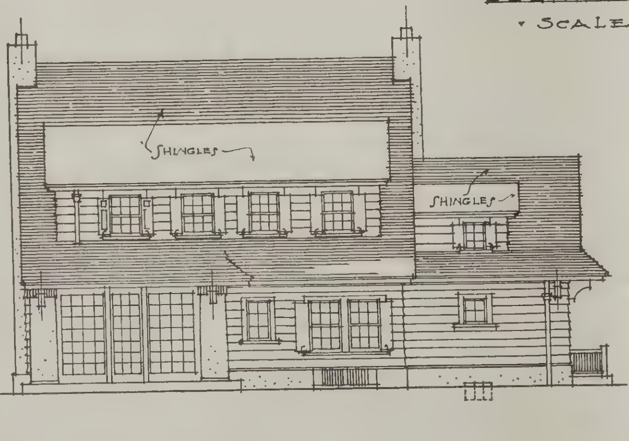


· FIRST FLOOR PLAN ·

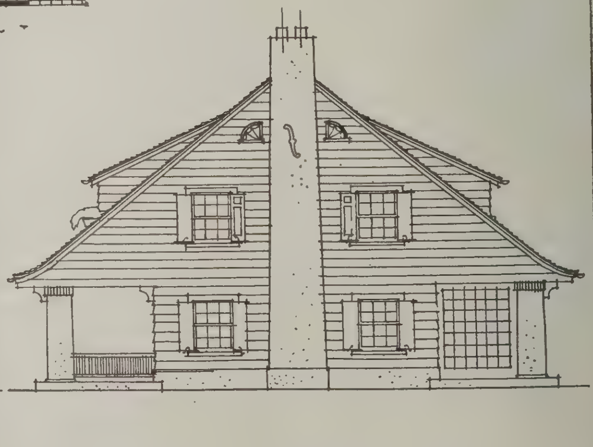


· SECOND FLOOR PLAN ·

· SCALE ·



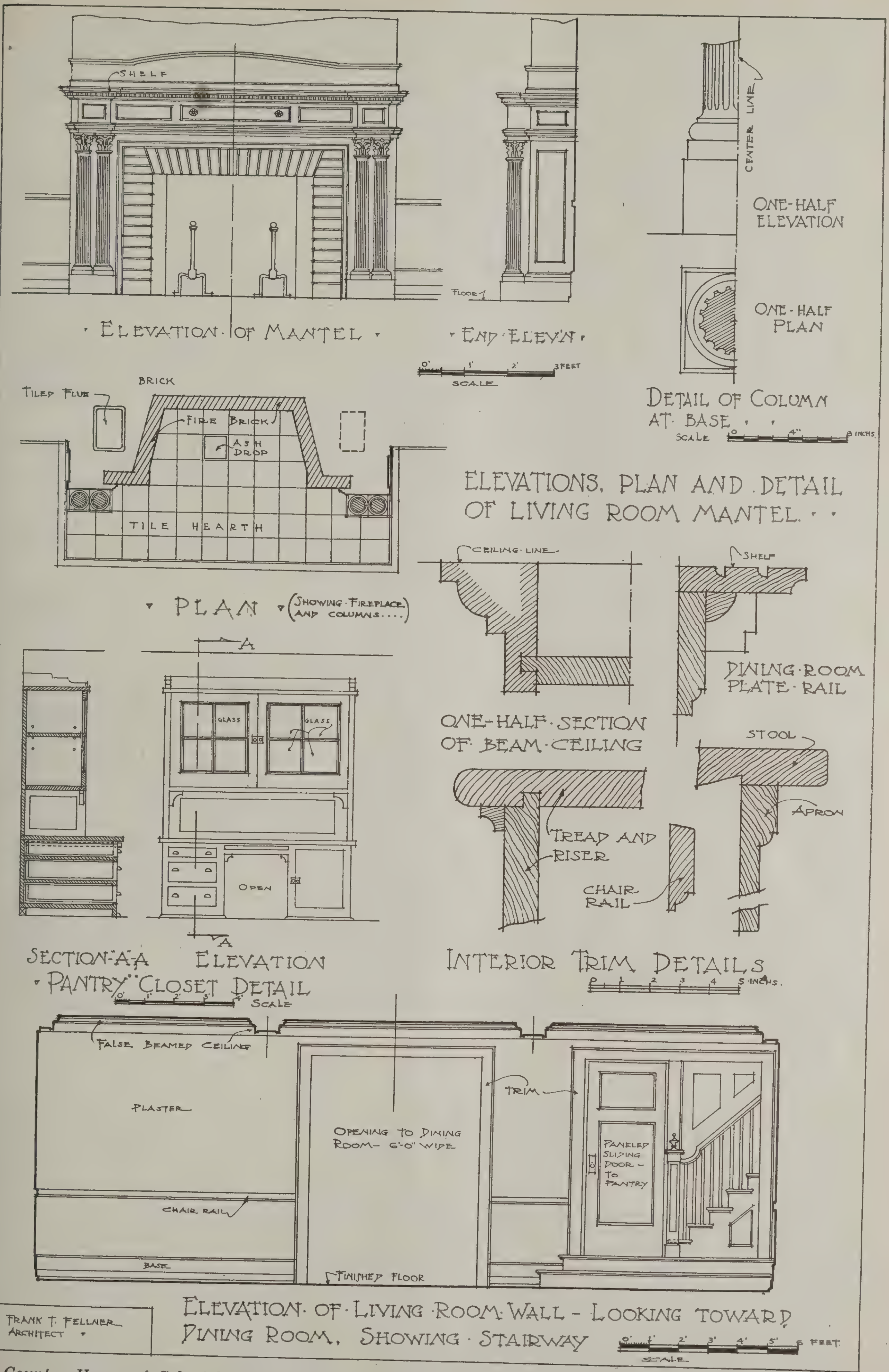
· REAR ELEVATION ·



· SIDE ELEVATION ·

FRANK J. FELLNER
ARCHITECT

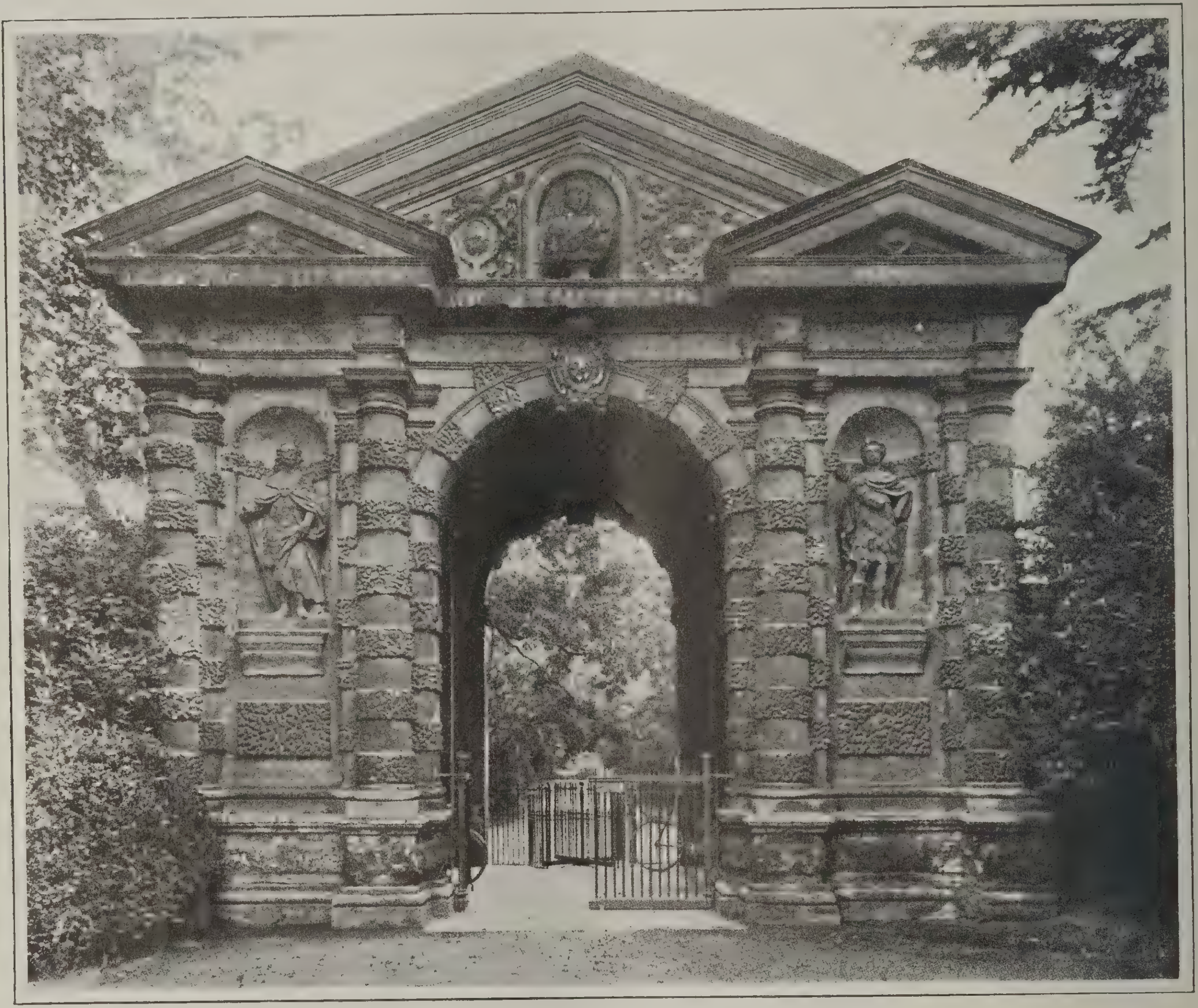
A Country House of Colonial Design—Plans and Elevations Relating to the House on This Month's Cover



A Country House of Colonial Design—Miscellaneous Constructive Details Relating to the House Shown on This Month's Cover

An Historic Stone Gateway

As an interesting specimen of ancient stone work we present herewith a picture of one of the three gates designed by Nicholas Stone in 1631 for the gardens at Oxford University, England. A careful study of the picture reveals a most clever treatment of the work and as it stands today it is a striking monument of the thorough manner in which masonry was executed in days long since gone by. The commission for the work was received from the Earl of Danby whose bust will be noticed in the center of the pediment and who instituted the gardens "with a view to the general improvement in learning and especially to the faculty of medicine." The figure appearing at the left of the entrance is probably Charles I, while that on the right is Charles II.



An Historic Stone Gateway—One of Three Designed by Nicholas Stone in 1631

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Boston's Big Fire Loss

In making his annual report for the fiscal year just closed Fire Commissioner Charles H. Cole, of Boston, Mass., points out that 80 per cent. of the $3,105,000 fire loss in that city last year was preventable. He refers to two causes of the preventable fire loss—lack of enforcement of existing laws owing to an unscientific scattering of authority through different boards and the inadequacy of the laws with respect to the material, construction and occupancy of buildings. He advises the centralization of all authority with respect to danger from fire under one department created for this purpose only and improvement in the laws dealing with construction, alteration and maintenance of buildings. He would permit the fining of the owners of buildings in which fires occur owing to defective chimneys and the punishment of persons who allowed fires to originate through carelessness as guilty of misdemeanor.

One of his recommendations is a special zone in the business district in which only construction of the first class should be allowed. Other suggestions are that no more wooden roofs or wooden coverings on roofs be allowed; that all buildings of five or more stories be of fireproof construction; that no building of any kind be nearer than 10 ft. to another unless all openings in the walls are suitably protected and that no part of any third class building be nearer than 12 ft. to the nearest part of another third class building.

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The Canton Sheet Metal Contractors Association is the name of an organization of sheet metal men just effected in Canton, Ohio, with headquarters at 223 Third Street, S. E. C. L. Wills is president; L. S. Motz, vice-president; C. A. Zellers, secretary, and H. H. Wimer, treasurer.

Geometry for the Ambitious Mason

English Practice in Developing Profiles of Groined Vaults or Ceilings—Laying Out Niches

By John Y. Dunlop

THERE is something in a name but not everything, and, like all technical terms, the words "Geometry for Masons" must be taken in a restricted sense. Were it possible I would lead each of my readers through the various stages of the work in a mason's yard and show him just how this drawing is applied to the actual work. But such exposition is impossible, so I shall attempt to show the drawings for masons on paper.

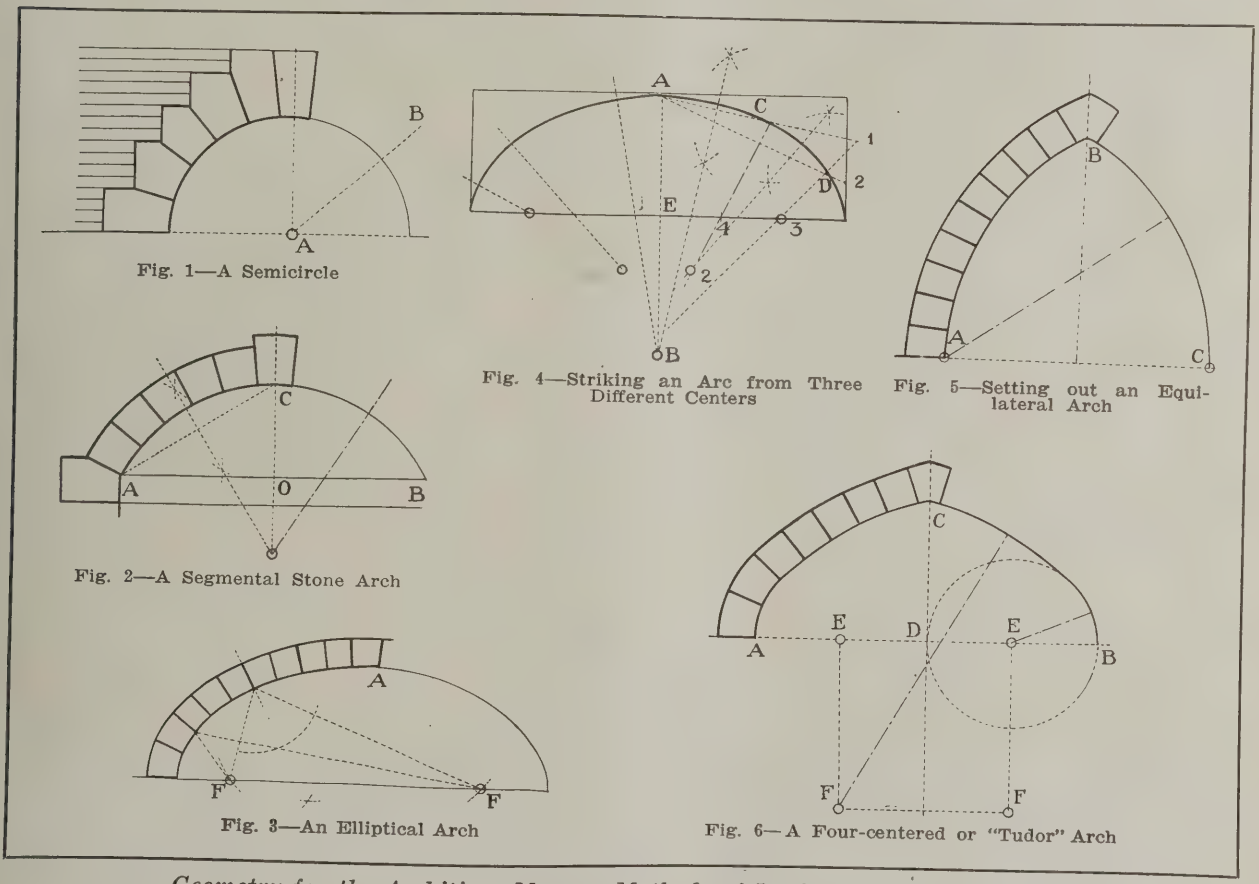


Fig. 1—A Semicircle

Fig. 2—A Segmental Stone Arch

Fig. 3—An Elliptical Arch

Fig. 4—Striking an Arc from Three Different Centers

Fig. 5—Setting out an Equilateral Arch

Fig. 6—A Four-centered or "Tudor" Arch

Geometry for the Ambitious Mason—Methods of Laying Out Various Arches

The geometry of arch construction is likewise the geometry of the circle, which is a plane figure contained in one curved line which is called the circumference. The line is such that all points in it are equidistant from a point within the circle called the center. Fig. 1 shows a semicircle and a radius or normal to the curve at *A-B* which is the true position of all arch joints. The left-hand half of the arch is shown completed with square bonding on the back for brickwork.

In the diagram, Fig. 2, is shown a segmental stone arch wherein *A-B* is the span and *O-C* the rise. In this problem the question is to find the circle to pass through the three points, *A*, *C* and *B*. To do this join *A-C* and *C-B* and bisect the lines. It will be found that the bisecting lines meet at the center. In this diagram the left-hand of the arch is shown complete with skewback, voussoirs and key block. In Fig. 3 is shown an elliptical arch which is usually struck for most practical purposes with the trammel. This method, however, is not convenient for arches owing to the labor in determining the bed joint, which is obtained as follows:

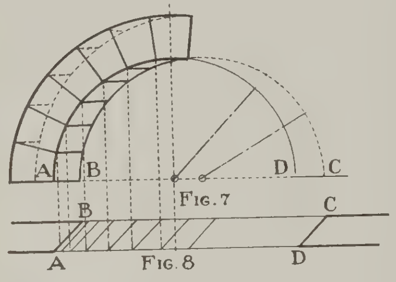
Divide the soffit into the convenient number of stones and find the points *F-F* by taking a distance equal to half the span and with the point *A* as center describe an arc. Join the divisions of the soffit of the arch to the points *F* and in each case bisect the contained angle. In practice if this method is adopted each voussoir is of a different shape, thus requiring a separate template for each block. This may be avoided by striking an arc from three different centers as shown in Fig. 4. This curve is a close approximation to a true ellipse and requires only three templates to cut the voussoirs.

To draw the arch describe a rectangle having for its sides the span and the rise, divide the vertical side into three equal parts as indicated by 1 and 2, and half the span into three parts as indicated by 3 and 4. From the points 1 and 2 draw lines to the point *A* and from *B*, which is the distance of *A-E* from *E*, draw lines through 3 and 4. The intersection of the lines drawn through 1 and 4 and 2 and 3 are points in the curve of a true ellipse.

To find the first center draw the line *A-C;* bisect it and the intersection of the bisecting line and the rise line produced will give the desired result. Join *C-D* and bisect it. The intersection of the line with *C-B* will give the center 2. The intersection of the common normal from center 2 with the springing line will give center 3. Now all the bed joints are struck from the centers of the segments as they are situated.

Fig. 5 shows the setting out of an equilateral arch described about an equilateral triangle, *A-B-C.* This is all the setting out required with the exception of the joint molds.

Fig. 11 represents an arch which is circular in plan, Fig. 9 representing half the elevation of the arch. To set out the developed part of the elevation shown in Fig. 10 let Fig. 11 be the plan of segment of cylinder with the semi-cylinder penetrating it at right angles to the axis. Fig. 9 represents half the square section of the quadrant of the cylinder. Divide this into the number of arch stones required and project on to the segment line *A-B* of the plan. Transfer these measurements to the right-hand side of the arch and develop them on to the line *B-C.* At each of the points on the developed line erect perpendiculars and make them equal in hight to the perpendiculars in the square section. Draw lines through the intersecting points which will give the curve required on the development at the point of penetration for the outside or convex face of the cylinder.



Figs. 7 and 8—Elevation and Plan of a "Skewed" Arch

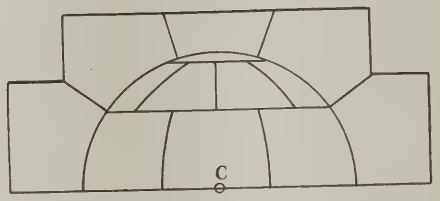


Fig. 12—Elevation of a Semicircular Niche Head

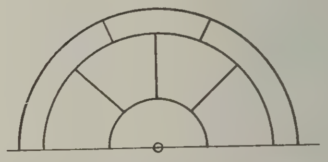


Fig. 13—Plan of a Niche Head

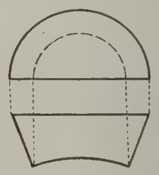


Fig. 14—Templates for the Key Block

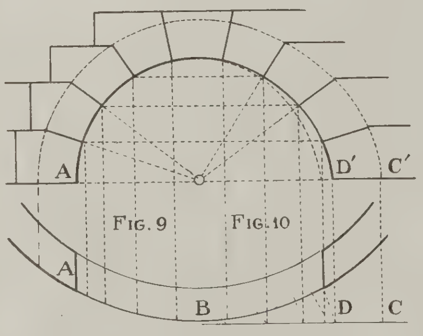


Fig. 11

Fig. 9—Half the Elevation of the Arch
Fig. 10—The Developed Portion
Fig. 11—An Arch Circular in Plan

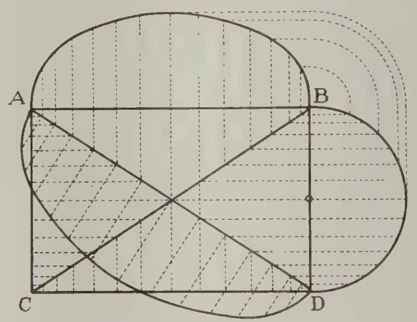


Fig. 16—Diagram Showing How to Obtain the Profiles or Curvature of a Groined Vault

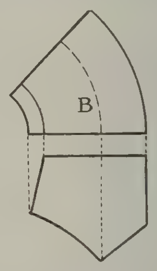


Fig. 15—Molds to Work Face Stone Course No. 2

Geometry for the Ambitious Mason—Sketches Relating to Arches, Vaults, Etc.

The centers A-C are the extremities of the span. The joints are drawn to the radii or centers *A-C.*

Fig. 6 shows a four-centered or Tudor arch, *A-B* being the span and *C-D* the rise. Two of its centers, *E-E,* are on the springing line and the other two, *F-F,* are below it. The joints are drawn from the centers *E-E* and *F-F* as shown and require no further explanation.

Figs. 7 and 8 show a skewed arch, the elevation of which is a semicircle. Fig. 8 represents the plan of the opening. Draw the elevation of the outer face of the arch, which is semi-circular, and mark off the convenient number of equal parts. Draw the elevation of the soffit line of the back arch. Draw the bed joints on the soffit, which are perfectly horizontal. The radiating lines and joints are also parallel to each other and are therefore in the same plane. Complete the plan by drawing the soffit joints parallel to the sides of the opening.

For the development of the joints and the inside or concave face repeat the method. The molds required for the working of each arch block are a bed mold and two face molds.

In Figs. 12 and 13 are shown the elevation and plan of a semi-circular niche head. Draw the face line of the niche on the plan and describe the semicircle showing the extent of the recess. Draw the springing line of the elevation and with *C* as center describe the semicircle for the outer curve. Divide this into five parts and draw the radiating lines for the joints, which will also cut the horizontal bed at the same bevel right round as it makes on the face. For the horizontal joints on the plan project from the niche head and for the dividing joints draw from the center of the circle taking the first course in three stones and the second course in four stones. The top course is in one stone and to prevent any tendency to slip out of its place forward the upper part of the stone may be kept square. This would mean that the top bed of the second course would require notching on the inside.

We show in Fig. 14 the templates required to work the key block. The stone is first cut to a uniform thickness to receive the face mold, then the top mold and line of joint on the soffit are marked off.

Fig. 15 shows the molds to work the face stone course 2. Here *B* is the bed mold transferred from the plan, the lower line being the vertical face of the front. The lower portion of the diagram is the face mold transferred from the elevation which will also apply for the joint mold of the rest of the stones in that course. The mold for the springer can be obtained in same manner as for course 2.

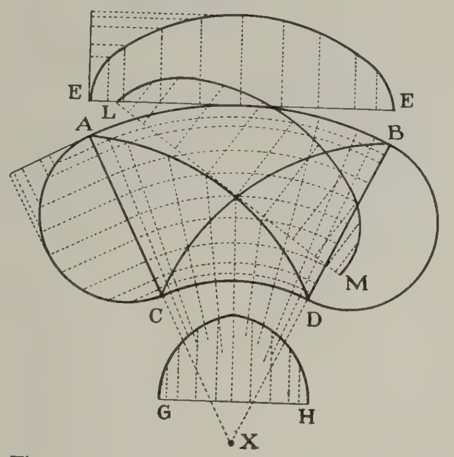


Fig. 17—The Profile for the Annular groin

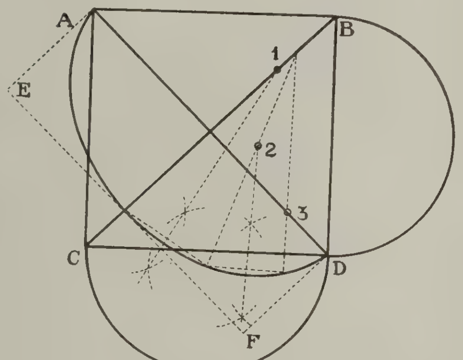


Fig. 18—Practical Method of Setting off a Square Vault

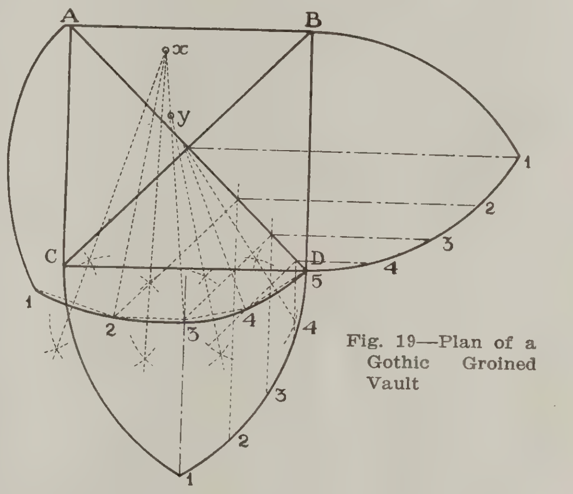


Fig. 19—Plan of a Gothic Groined Vault

Geometry for the Ambitious Mason—Sketches Relating to Vaults of Various Kinds

In Fig. 16 we show how to obtain the profiles or curvature of a groined vault of which *A-B-C-D* is the plan formed by the intersection of two semi-cylinders. The section on *B-D* is semicircular and is divided into any number of equal parts, the ordinates being projected through the springing line on to the diagonal. Erect ordinates perpendicular to the diagonal and make them equal in hight to those of the semicircle. Through the points of intersection draw the semi-ellipse which is the curve of the groin.

The top profile is obtained in the same manner, namely by projecting ordinates from the diagonal and making them of equal hight to those of the semicircle, then tracing the semi-elliptic curve through the points of intersection.

Coming now to Fig. 17 we show the profile for the annular groin. The method is somewhat similar to the one last described except in place of dividing the semicircle we divide the diameters *A-B* and *A-C* into the same number of equal parts, erect ordinates cutting the semicircle on *A-C*.

Now from the points on the segmental diameter *A-B* draw the radiating lines from the center *X* and with *X* as center describe the concentric arcs at each of the divisions on the line *A-C*. Through the points of intersection draw the curves *A-D* and *C-B*, thus giving the plan of the groins.

To obtain the outer and inner profiles develop the segmental lines *A-B* and *C-D* as right lines, transferring all the divisions. At each point erect an ordinate equal in hight to the corresponding one in the semicircle, and through the points draw the curve which gives the true sections.

To find the profile of the diagonals *A-D* and *C-B* develop each as right lines, transferring the divisions and on them erecting ordinates equal in hight to those of the semicircle *A-C*.

In practice the two last molds have the disadvantage of the outer section and the curve for the groins being struck freehand. This is very inconvenient in the case of large arches and it also leaves the striking of the joints of the ribs very much a matter of chance or causes a great amount of labor in determining the bed joints which should be normals to the curve.

The diagrams, Fig. 18, represent a practical method of setting off a square vault which the writer has found very useful. *A-B-C-D* represent the compartment, *A-D* and *C-B* being the diagonals. Draw the semicircular profiles on springer *B-D* and *D-C*. Then on the diagonal *A-D* set off a rectangle, the hight of which is equal to the hight of the vault. In the enclosed rectangle draw a semi-ellipse by the method explained in Fig. 4. The bed joints on the rib can be struck from the centers of the segments in which they are situated.

The plan of a Gothic groined vault is presented in Fig. 19, where *A-B-C-D* shows the plan of one compartment, with the elevation of the wall and transverse rib each being of an equal hight at the apex and the ridge line of the vaulting surface being also level throughout. Draw the line of the diagonal rib and to obtain the profile of the rib we must first consider the shape of the vault.

If the vaulting or filling in between the ribs is rectangular in shape and parallel to the sides, the courses of stone forming the vaulting surfaces are level, and the upper edge of the diagonal rib upon which it rests are portions of elliptic curves. These curves are obtained by ordinates, the curvature being subordinate to the wall rib. This is sometimes done, but as the elliptic rib entails more work, both in the setting out and the execution, the simpler method of using compound circular curves is generally adapted and with perhaps better results constructively. The ribs are thus made geometrically regular while the filling in surface takes a chance, as it were, and is adjusted to suit the curvature of the rib.

The line *A-D* on the plan is the center of the diagonal rib. Divide the wall rib into any four convenient parts and draw projectors on to the diagonal. Through the intersections of the ordinates with the diagonal draw lines at right angles to *A-D* and set off the hights to correspond with those on the wall rib, thus four points are obtained in the curve of the diagonal rib all as shown.

Commence now to find the center of a circle to pass through the points 1, 2 and 3; also the center of a circle which will pass through 3 and 4 and lie on the line 3-x and the center of the circle which will pass through 4 and 5 and lie on the line 4-y.

The joints of the rib may now be drawn at any convenient length to suit the size of the stone and they must radiate to the centers from which that part of the rib has been struck.

◆

Conclusiveness of Receipt in Full

A recent decision of the Supreme Court of Appeals of Virginia bears on the question of the conclusiveness of a payment received by a builder under a tender of the same by the owner as full payment of the builder's claim, where the builder claims that a larger amount is actually due. This decision follows the rule announced by most of the courts to the effect that the builder's right to recover an additional sum depends upon whether there was a bona fide dispute between the parties; if such dispute existed the payment tendered and received is a final discharge of the debt.

From the facts in this case it appeared that an owner was *indisputably* indebted to a firm of builders in the sum of $6,450.54, and when they agreed to "knock off" $20 if paid at once, he told them that he did not desire any discount. Later, however, he tendered a check for $6,000, claiming that he was entitled to deduct the $450.54 as damages for claimed delay in completion of the buildings covered by the contract, and gave the builders the ultimatum of accepting $6,000 in full settlement, or of suing for the whole amount. Being urgently pressed for money, the firm accepted the check and gave a receipt in full and sued for the balance. In sustaining their right of recovery, in the case of Thomas & Cross vs. Brown, 81 Southeastern Reporter, 56, the Virginia court holds that there were no real differences between the parties and hence no basis for a compromise.

New Type of Western Dwelling House

A House in Butte, Mont., Constructed Wholly of Quartz Rock, Each Piece Assaying Some Kind of Mineral

By Russell Waldo

THE many readers of *The Building Age* will doubtless be interested in the pictures and floor plan of the house here illustrated which, as I understand it, is the only one in existence constructed wholly of quartz, each piece of rock assaying some kind of mineral. The majority of the rocks are honeycombed, showing where, in the course of a few years, the rain and snow have carried away the mineral. The house is patterned after a Swiss chalet, and very heavy timbers have been used. The stone for building the house was gathered at the site, as were the stones used in constructing the rustic walls shown in the pictures.

The house is the work wholly of a woman. She developed the layout of the rooms and was her own contractor in the construction work. She employed carpenters by the day and a skilled roofer to erect the roof. She had a young man from one of the mine offices draw up the first floor plan which is here presented and the remainder was worked out under her guidance.

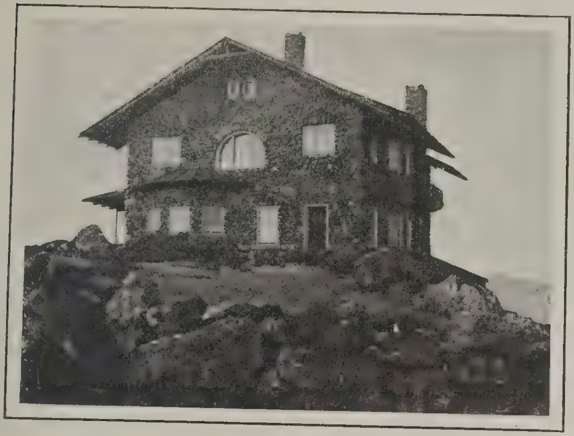
As the house is not completed inside she has two rooms in one end sufficiently finished in which to live. The main floor plan shows the general arrangement of rooms in the first story, while the second story is one large room free from columns or supports and which will be ultimately used as a studio. The idea of the owner is to have all beds fold back against the wall so that they will in no way interfere with the use of the room for studio purposes. All seats, bookcases and other studio furniture will be of the built-in type.

The bath tub will be located over the kitchen and enclosed by curtains. The wash bowl is to be enclosed in a locker in the room.

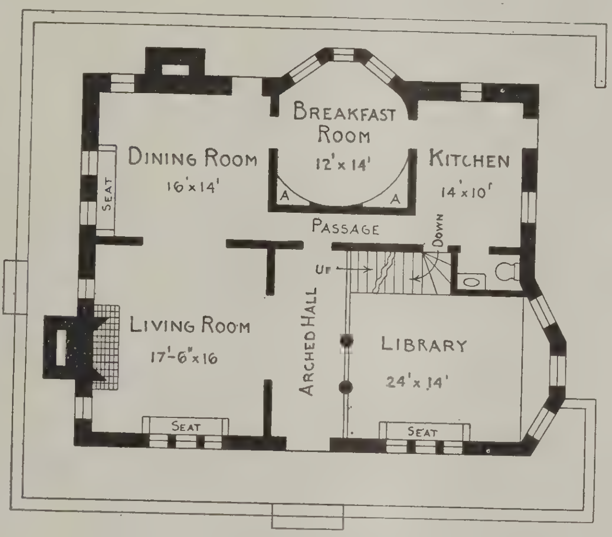
The roof is to be covered with shingles stained brown. The three girders which run the short way of the house at the second floor are 8 x 12 in.

In the library and dining room under the triple windows as shown there is a seat of massive design. The space under the seat in the bay window of the library will be utilized for books. In the corners of the breakfast room opposite the bay window are small china cupboards.

The entrance from the hall to the library is between the two massive columns shown on the plan. The space at the right and left of these columns is to be closed by curtains.



View of House from the South West



Plan Showing General Arrangement of the Rooms

Between the living room and the arched hall, also between the dining room and the living room, curtains and French doors are to be used. All the smaller doors will be of the single pattern while the two larger spaces will have double doors.

All rooms except the kitchen have 6-ft. paneling. The 4 ft. above this paneling is to be painted a light color. The paneling as well as the mosaic ceiling is to be stained in walnut. The kitchen and breakfast room are to be finished in white. The front door, measuring 4 x 7 ft. in size, is of solid oak.

The walls of the house are 20 in. thick, being rough stone outside and a veneer of brick inside. All rooms have a 10-ft. ceiling.

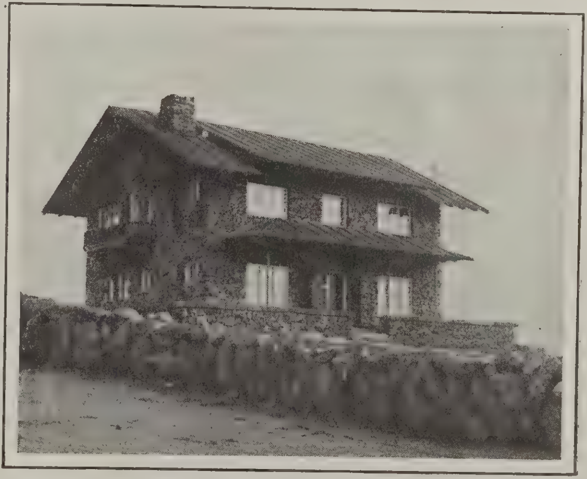
The owner of the house is a Mrs. Armstrong, who expects to expend about $20,000 on the house by the time it is completely finished.

◆

Training Trades School Teachers

There was a lack of something in training young men for the trade in the methods of the past which has been widely recognized and there are indications that it is to be supplied in the new method that has been applied to this work. Last fall the Pratt Institute, of Brooklyn, N. Y., experimented in the matter of training teachers of shop work in industrial and trade schools by establishing a training class. The experiment was entered into with the advice and co-operation of the National Society for the Promotion of Industrial Education. As the result of the close observations of Secretary E. A. Prosser, of this national society, a letter has been sent to a number of vocational and trade schools throughout the country, from which the following is taken, as it refers to the course of instruction given at the Pratt Institute. The letter asks the co-operation of those to whom it is sent in placing the men who have graduated from this class, and states that the class consists of nineteen men, each of whom is now working in the industry and represents the following trades: Machine work, machine drafting, carpentry, pattern making, electrical wiring, electrical maintenance and plumbing. Being selected as they are from among some sixty applicants by the director of the class in conference with practical men, there is every guarantee that they were unusually qualified for teaching in the industrial school.

Not only have these men been very carefully selected but their training is of a very practical character. It has been in charge of Wesley A. O'Leary, who was formerly director of the New Bedford Industrial School and well qualified for his work. The course consisted of 144 hours of 4 hours a week of lectures and round-table conferences and 2 hours to practice under supervision in the New York Evening Schools. In addition, most of the men have been doing extra practice teaching, and material for conference and discussion has been drawn in part from the students' experience in the practice of teaching, and has been in part formulated along the lines developed in training teachers by the society.



The House as Viewed from the North East

A New Type of Western Dwelling House

A Hollow Tile and Timber Residence

An Exterior Treatment and an Arrangement of Rooms Which Well Adapt the Design for a Suburban Site

WE have taken for our colored supplemental plate this month the design of a country house of clever exterior treatment and compact arrangement as may be seen from the floor plans upon the following page. The miscellaneous details upon the plate which follows the plans afford an excellent idea of some of the many features of construction. The design admirably leads itself to suburban surroundings and for an exterior color scheme has light-toned walls, dark trim and a tin roof painted red.

The Wall Construction

The main foundation walls are of local field stone 18 in. thick with a footing course projecting 8 in. on both sides. The walls of the first story are of 8-in. clay tile covered with two coats of "pebble dash" stucco colored to a light tint with mineral pigments.

The second story walls are of skeleton frame covered with 1 x 10-in. tongued and grooved sheathing laid diagonally, over which heavy building paper was placed and this in turn covered with 1 x 10-in. boards laid vertically with 1¼ x 2½-in. cleats or battens at every joint.

The roof has 2 x 8-in. yellow pine rafters placed 16 in. on centers. These support 1 x 10-in. yellow pine tongued and grooved sheathing boards covered with heavy building paper and on this is laid first quality roofing tin with standing seam. The ridge pole is 1¼ x 10 in.

The floor beams are 2 x 10 in. hemlock, placed 16 in. on centers and the girders 4 x 6-in. spruce.

The cornice of the main roof and around the porch is constructed as shown on the drawings. The window frames for the first and second story are of white pine. The square posts of the porch are of the box type made from ⅞-in. stuff built around a rough stud construction.

The Trim and Plaster Work

The floors throughout are ⅞ x 2½-in. tongued and grooved comb grained maple, blind nailed. All interior trim is cypress and the base throughout ⅞ x 6-in. molded with a ½ x 1-in. quarter round nailed to the floor.

The walls of the first story are plastered direct to the 8-in. hollow tile with two coat work. The finish coat may be sand or hard white finish according to preference. The second floor walls are lather and plastered and have a sand finish. Metal corners are used at all projecting angles.

Extra heavy cast iron pipes are used for soil and vent lines—4-in. soil and 3-in. main vent with 2-in. vents for fixtures. The bath, kitchen and pantry fixtures are of enameled iron and the piping in connection with the bath room fixtures is nickel plated. The bath room floor is of hexagonal white tile with sanitary cove and base.

The house is provided with combination gas and electric fixtures, the dining and living rooms having four and five drop penants respectively. The bedrooms have drop and wall brackets.

The house is intended to be heated by hot-air system with wall or floor outlets according to preference. The heater is to be provided with fresh air duct intake box connected with the outer wall in the usual way.

The gutters are of the half round hanging type made of galvanized iron and supported every 4 ft. with adjustable galvanized iron hangers.

The Painting

All exterior woodwork has three coats of paint ground in linseed oil; the roof two coats of roofing paint and the exterior trim is painted a dark brown. All other woodwork, such as the siding of the second story is a light cream. The interior woodwork is intended to be stained and varnished.

The cost of the house based on its cubic contents is as follows:

House 25 x 40 x 25 ft. equals	25,000 cu. ft.
Cellar 17 x 20 x 5 ft. deep equals	1,700 cu. ft.
Total	26,700 cu. ft.

At a unit price of 18 cents per cubic feet the approximate figure would be $4,806.

Estimate of Cost of Labor and Materials

In dividing the work into its natural classifications the estimate of cost of labor and materials is as follows:

Excavating	$40.00
Grading	35.00
Masonry	1,112.00
Concrete and cement	459.00
Plastering	290.00
Carpentry	820.00
Mill work	454.00
Painting	230.00
Plumbing	295.00
Heating	250.00
Metal work	90.00
Roofing and tile work	380.00
Mantels	40.00
Fixtures, gas and electric work	246.00
Hardware	65.00
	$4,806.00

The house here shown was designed and the specifications prepared by Frank T. Fellner, architect, care *The Building Age*, 239 West 39th Street, New York, or 413 Caton Avenue, Brooklyn, N. Y.

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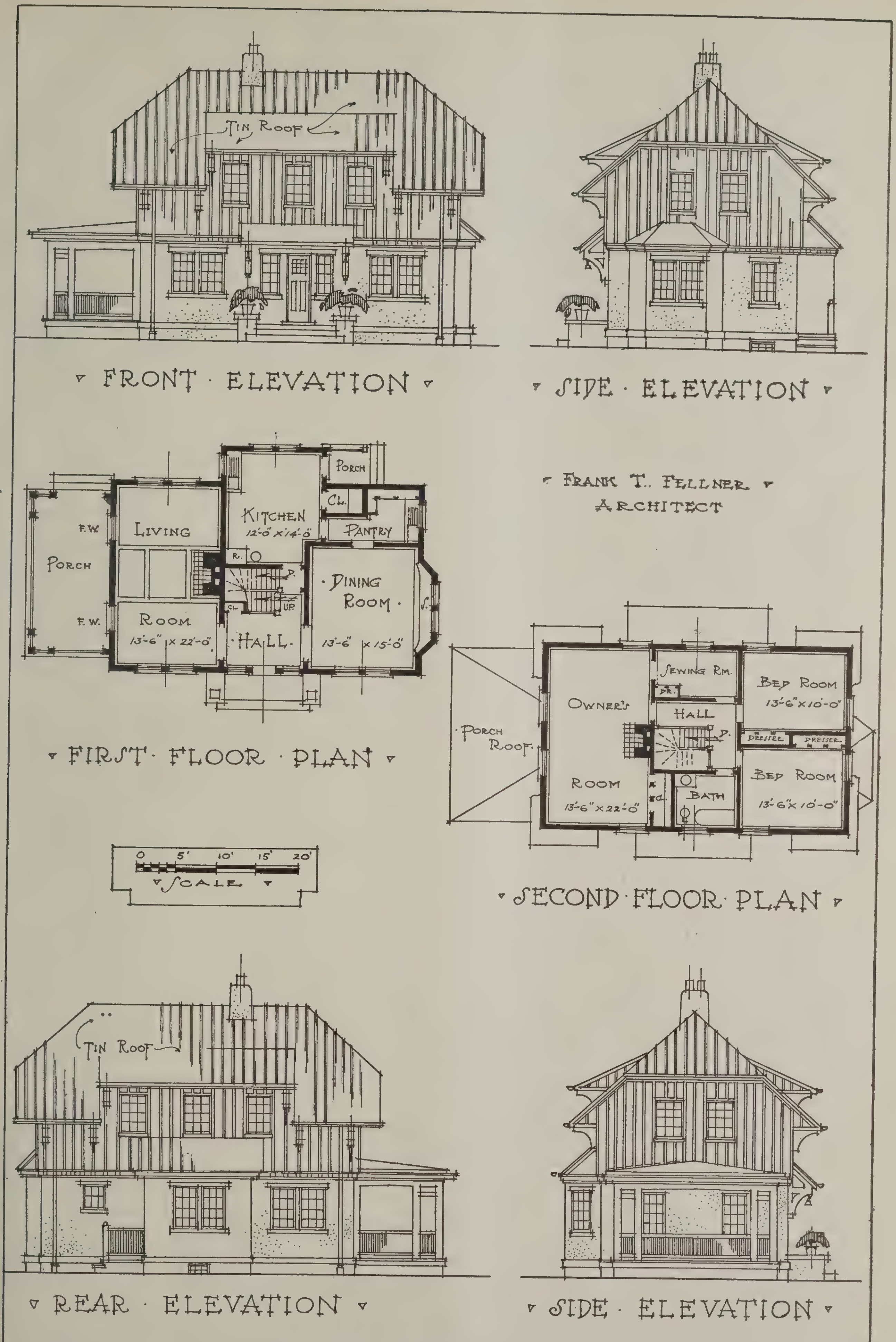
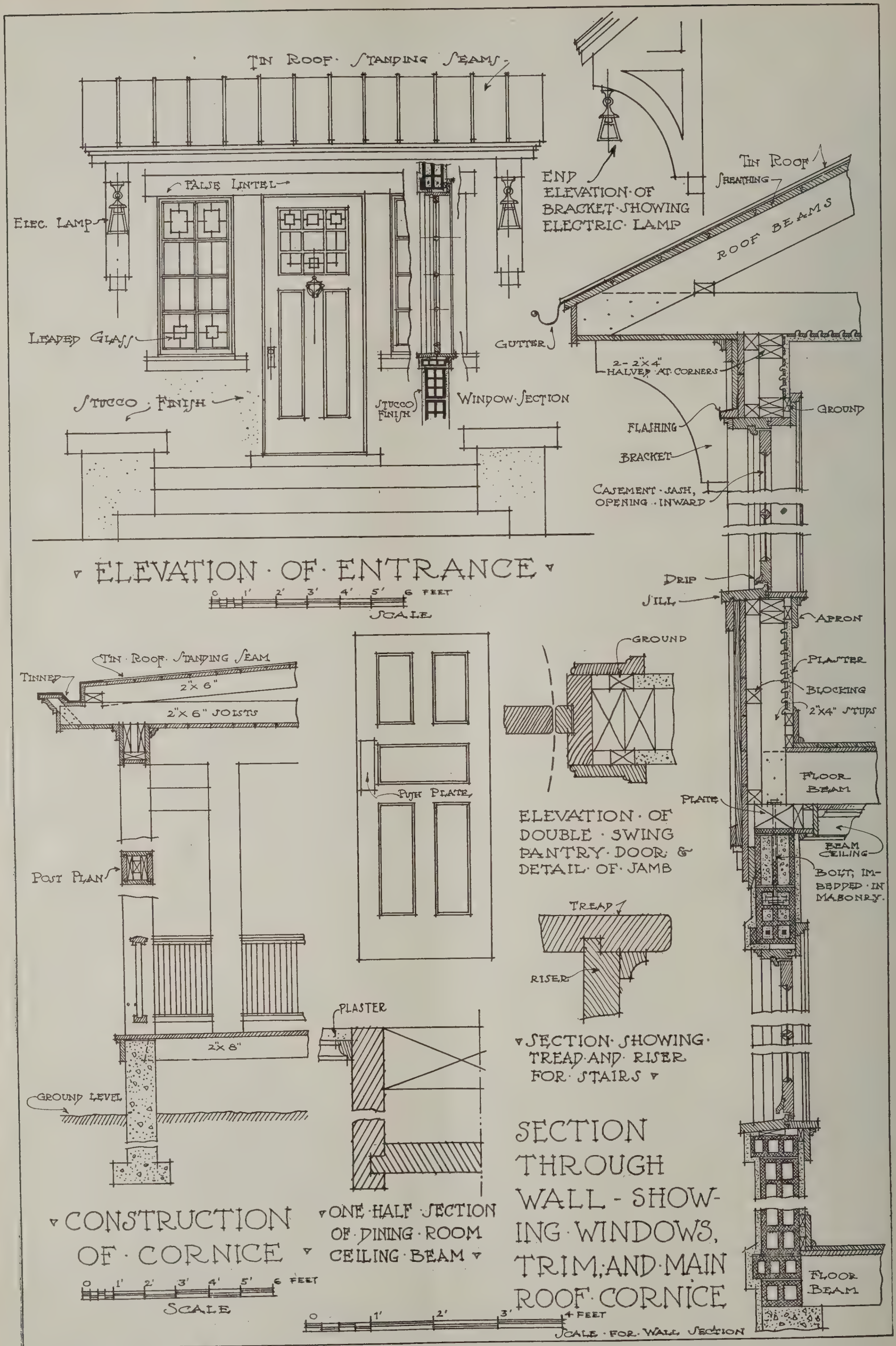
Improving Spanish Industrial Schools

The Department of Public Instruction and Fine Arts of Spain has been allotted $63,000 for use toward establishing and improving workshops of the country's industrial's schools; $18,000 of this has been taken for installing laboratories and commercial museums in Spanish schools of commerce, while the remaining $45,000 is to be distributed among the industrial schools in the capitals.

BUILDING AGE
NEW YORK



A Hollow Tile and Timber Residence—Plans and Elevations Relating to the Colored Supplemental Plate


Tin Roof · Standing Seams
Elec. Lamp
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End Elevation · of Bracket · Showing Electric · Lamp
Tin Roof
Sheathing
Roof Beams
Gutter
2 - 2"x4" Halved at Corners
Ground
Flashing
Bracket
Casement · Sash, Opening · Inward
Drip
Sill
Apron
Plaster
Blocking
2"x4" Studs
Floor Beam
Plate
Beam Ceiling
Bolt, Imbedded · in Masonry.
▿ ELEVATION · OF · ENTRANCE ▿
0 1' 2' 3' 4' 5' 6 FEET
SCALE
Tin · Roof · Standing Seam
Tinned
2"x 6"
2"x 6" Joists
Post Plan
2"x 8"
Ground Level
▿ CONSTRUCTION OF · CORNICE ▿
0 1' 2' 3' 4' 5' 6 FEET
SCALE
Push Plate
Plaster
▿ ONE · HALF · SECTION OF · DINING · ROOM CEILING · BEAM ▿
Ground
ELEVATION · OF DOUBLE · SWING PANTRY · DOOR & DETAIL · OF · JAMB
Tread
Riser
▿ SECTION · SHOWING · TREAD · AND · RISER FOR · STAIRS ▿
SECTION THROUGH WALL - SHOWING WINDOWS, TRIM, AND MAIN ROOF CORNICE
Floor Beam
0 1' 2' 3' 4 FEET
Scale · for · Wall · Section

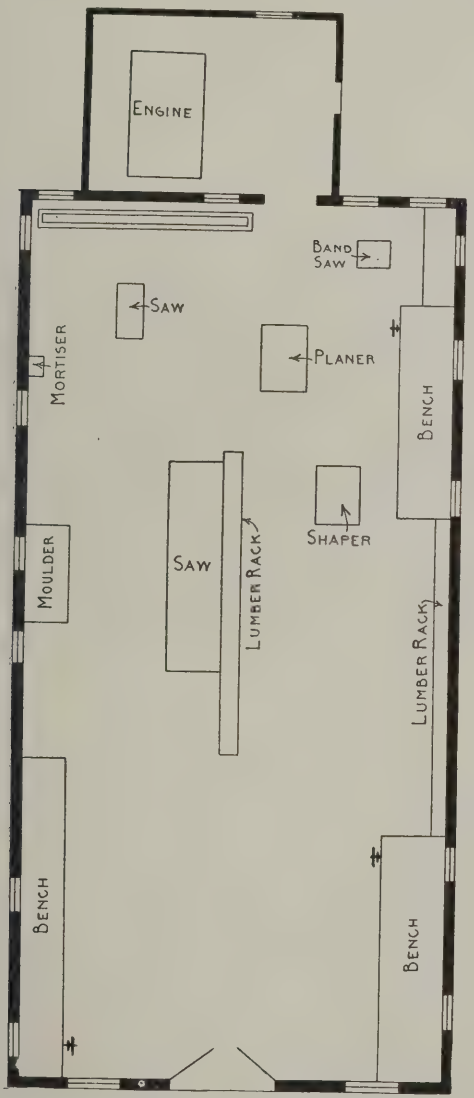
A Hollow Tile and Timber Residence—Miscellaneous Constructive Details Relating to This Month's Colored Supplemental Plate

CORRESPONDENCE

A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Plan of a Small Carpenter Shop

From Builder, Redford, N. Y.—A short time ago a correspondent, "C. W. L.," asked for the layout of a small carpenter shop, and as I have seen no answer to this request I am enclosing a plan which I drew for myself and which may give the correspondent an idea as to how to work out his. If the business warrants it the shop should be two stories in hight. Brick veneered walls and a flat roof will make a good-looking building. The machinery should rest on concrete foundations and be so placed that one line shaft will serve for all of them. An horizontal engine is steady and serves an excellent purpose.



Plan of a Small Carpenter Shop Showing Arrangement of Machine Equipment

Form of Sub-Contractor's Agreement

From Duncan L. Swearingen, Sewickley, Pa.—I am enclosing a copy of the form of sub-contractor's agreement which I use in my business as builder and contractor. I think it is pretty well boiled down from the uniform contractor's agreement. It is a short and simple form and any one doing an honorable business does not hesitate to sign it as after each one has signed there is no more peddling of bids and each party knows where he stands in regard to a job.

An agreement should be made with each sub-contractor and it should be signed by each party for many reasons. First of all if a contractor takes sub-bids before submitting his estimate to the architect he is basing his price on theirs, and if he secures the job he is honorably bound to give the sub-contracts to the lowest sub-bidders provided they are accepted by the architect. They should sign a contract so that when this work is ready for execution they will be in readiness to do it and will have made previous arrangements for the material.

MEMORANDUM OF AGREEMENT.

Sewickley, Pa..............191..

D. L. SWEARINGEN,

Dear Sir—......hereby agree to furnish all materials, including ....
....
....
....
according to Plans and Specifications, and in compliance with general conditions thereof, prepared therefor by............ ...., Architects, for the sum of................ (........), and agree to accept payments of......per cent. monthly, of the labor furnished and materials in place as work progresses, and balance thirty days after the building is completed and accepted.

....further agree to prosecute the work promptly and complete the same so as not to detain or delay the progress or completion of the building.
....
....

....will comply with all City, County, or Borough ordinances in putting up lights, serving notices, taking out permits, etc., and will protect and save you harmless from any damages resulting from accidents arising from our neglect or failure to comply with the same.

....will assume all responsibility arising from accidents or damage caused by our work; will also clean up and remove from the building and premises all rubbish caused by our work; will cover and protect work where necessary, and in case of failure or neglect to furnish materials and labor as agreed upon, will allow you after......................... notice in writing, to furnish the same at our expense, or if ....delay the progress of the work so as to cause loss to you, you may deduct all costs of same and amount of loss you sustain from any money due.

In witness whereof....have hereunto set....hand and seal.

..............................[SEAL.]
(Witness), ...[SEAL.]

....hereby acknowledge the above as acceptable and binding.

(Signed here by D. C. L.)

..............................[SEAL.]
(Witness), ...[SEAL.]

If you do not have an agreement with your sub-contractors some of your bids I presume will be verbal, some will be in writing and some by telephone. For some of the men it may probably be three to six months before the job is ready and probably some kinds of material have advanced in price and possibly labor has advanced as well. The chances are the bidder is not a millionaire and in these times it is every man for himself. He will probably tell you when you notify him to proceed with his part of the work that he cannot do the work unless he receives more money; that everything has advanced in cost and that he will lose money if he takes the job. If a sub-contractor does not want to do a piece of work for you I would like to see the work after you have compelled him to do it at a loss.

The only thing to do if you are sub-letting any part of the work is to tie them up before they learn of every other bid that their competitors have given on the same work. They should take care of the labor and materials in their line. The general contractor should take no risk of the rise.

I have had twelve years of this and more than once a sub-contractor came to me and said he was too low in his figures and would lose money. This may be, but every kettle should set on its own bottom. Get sub-contract agreements and then a bond if you are not sure of your man. It is better to pay for the bond yourself than take any chances.

I would like to have the practical readers of the paper comment on this form and if any one has something better I certainly will be glad to hear of it. I think it is a wise plan to exchange business views and ideas as very often it saves lawyers' fees to say nothing of blunders.

◆

Questions About Hoisting Rigs for Builders

From T. W., Montreal, Canada.—I would greatly appreciate it if Edward H. Crussell would show in his sketches of Hoisting Rigs for Builders' Use the position of the crab or winch when used with a 50-ft. gin pole for the purpose of hoisting steel.

I also wish he would show the position of gin pole when used for erecting stifflegged derricks.

Answer.—In reply to the above questions Mr. Crussell furnishes the following particulars: The proper placing and arrangement of a gin pole for hoisting purposes depends upon many things, tedious to describe and read about and most of which are liable to be overlooked by a person writing from a distance, though readily discernible to the man on the job.

The man in charge should do nothing haphazard but have a reason for every move he makes. There are always several ways to do a thing, though seldom more than one right way. It is not always safe to do the same job twice in the same way until we have considered every point and decided there is no room for improvement.

With regard to the position of the crab or winch when using a gin pole for erecting steel, there are two general arrangements. In one the winch is fastened directly to the lower end of the gin pole, in the same manner as it would be fastened to the mast of a hand-power derrick. In the other it is fastened down at some convenient point nearby and the full line of the tackle is led through a snatch-block from the foot of the gin pole to the winch.

In most cases this latter arrangement is the correct one to use, because the additional weight of the winch on the gin pole will make it that much more difficult to move from place to place.

In selecting a position for the winch when it is to stand at some point removed from the gin pole, it is usually well to so place it that no further movement of it is necessary, thus avoiding the labor involved in continually moving it and fastening it down.

The small picture which I send shows the roof trusses of a one-story machine shop. These were all riveted together on the ground and then hoisted and set in place with a gin pole. The winch was placed at this end of the building and the erection commenced at the far end, the pole standing on this side of the truss as it was raised so that nothing should be in the way of moving it back to a new position.

The trusses, if I remember aright, were spaced 12 ft. apart and the movement of the pole was easily and quickly accomplished by carrying the foot back to its new position, while the top of it rested on the roof truss just raised. The guys were then taken to new anchorage points and in a few moments the pole was again ready for work.

Questions About Hoisting Rigs for Builders

All the trusses except the last were made to clear the wall by swinging them cornerwise. There was not sufficient room to raise the last one in this manner, so the sling was fastened a little to one side of the center, thus raising one end of the truss first and allowing it to project over the wall sufficiently for the other end to clear.

With regard to the position of the gin pole when used for erecting a stiffleg derrick, here again there are more ways than one of accomplishing the desired end, either of which may be correct under given conditions.

One way is to stand the gin pole, inside the sills, near the mast foot and erect the mast first. The mast is then held perpendicular with temporary guy lines or stout braces, and the upper end of each stiffleg raised and set in place in its proper order. Or, again, it may for some reason be necessary (after raising the mast) to move the gin pole over to a point near the center of each stiffleg in turn so as to be able to pick them up bodily.

Still another method is to raise the stifflegs first, brace them in position and then raise and set the mast in place under them.

Some years ago the writer made a repair to a stiffleg derrick, a description of which may prove of interest. This derrick had no sills; the mast foot rested on one block of concrete and the lower ends of the legs were each imbedded in another, all the concrete being below the ground surface.

While unloading a large piece of machinery the men doing the work had in some manner swung the loaded boom of the derrick so hard against one of the stifflegs that it raised them sufficiently to allow the pin on the mast head to slip out of the stiffleg iron, and the mast, boom and load fell to the ground.

The repair we did was as follows: We first drilled and tapped a hole for a 1¼-in. bolt in the end of the mast head pin so that when it was in place once more the bolt screwed firmly in through a large plate washer would prevent a repetition of the accident.

The stifflegs, embedded as they were in the concrete, stayed up in place. We cut a stout post in between the upper end of one of the stifflegs and the ground and by the simple expedient of setting the post in a slanting direction and then forcing it up plumb we raised the stifflegs until there was room to put the mast in place under them. We then placed a sling around both stifflegs as near the top as possible and to it we fastened our tackle. After disconnecting the boom from the mast we raised the latter in place and entered the mast head pin into the holes in the stiffleg irons. A plank had already been adjusted so the top of it was level with the foot casting and along this plank we pried the foot of the mast till it dropped into place. Slacking off the post under the stifflegs allowed them to drop into place and screwing in the bolt and washer over the stiffleg irons and reconnecting the boom finished the job.

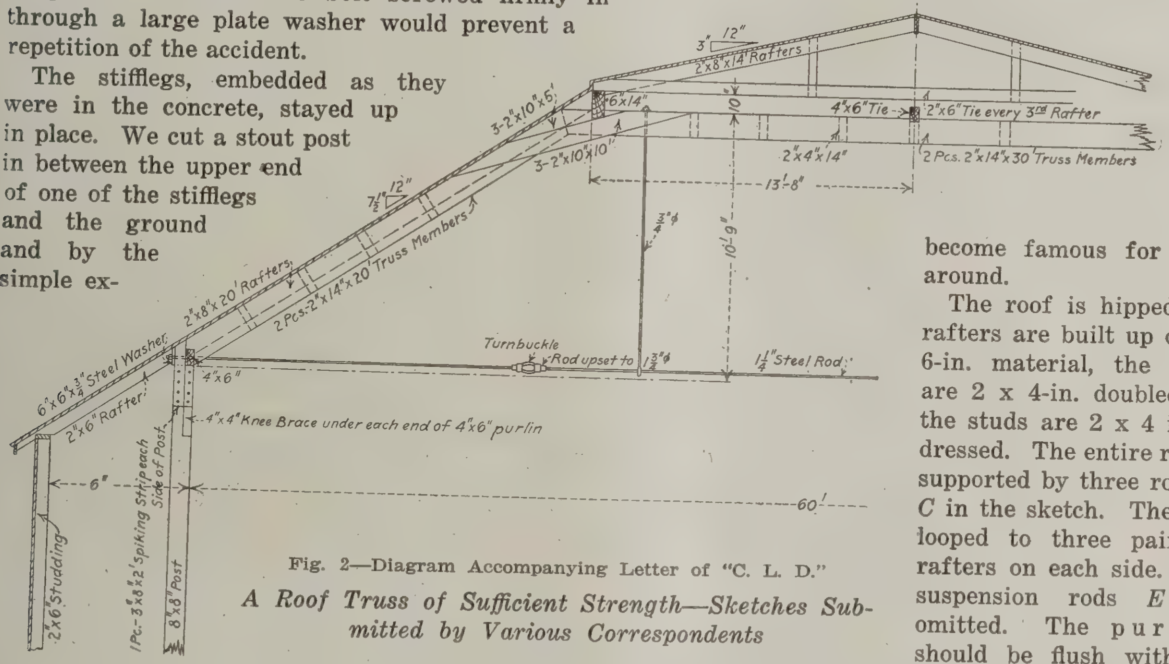


Fig. 2—Diagram Accompanying Letter of "C. L. D."

A Roof Truss of Sufficient Strength—Sketches Submitted by Various Correspondents

Roof Truss of Sufficient Strength

From D. P. Barry, Redford, N. Y.—In answering the request of "C. J. M.", St. Johns, N. F., in a recent issue of the paper I am enclosing a sketch of a truss which will carry his load and cut out a lot of useless work and material. The truss *B* in Fig. 1 will carry the center load with ease. A few years ago I trussed a dance hall in this manner, the trusses being placed 13 ft. on centers. There were three sets to carry the floor 39 x 52 ft. in area and there were two rods in each truss. If I remember rightly 60 couples have danced at once on this floor and there were also many on-lookers. The undulations are so harmonious the hall has become famous for miles around.

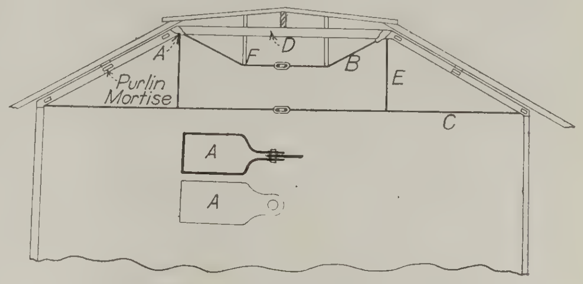


Fig. 1—Sketch Contributed by D. P. Barry

The roof is hipped; the rafters are built up of 1 x 6-in. material, the plates are 2 x 4-in. doubled and the studs are 2 x 4 in. all dressed. The entire roof is supported by three rods as *C* in the sketch. They are looped to three pairs of rafters on each side. The suspension rods *E* are omitted. The purlins should be flush with the top side of the trusses and tenoned into them as drawn. The loop *A* should bear partly on the girder *D* so it cannot be crowded upwards.

As the safe load for yellow pine is only 1000 lb. per sq. in. for columns under 15 in. diameter, the trusses should be 8 x 10 in. to resist bending. The chord *D* should be composed of three pieces 4 x 14 in. separated so the loops may go between. The struts *F* should be 5 x 8 in. each and 4 ft. long, capped with iron. There should be two tie rods 1½ in. in diameter. As no idea is given of the load this roof is to carry we can only guess at it and 8 x 10 in. will be scant enough. Assuming that each pair of trusses will have a load of 90,000 lb. the horizontal thrust will be 28,000 lb. Two 2 in. rods will be required for the chord *C*. A load of 50,000 lb. will require two rods 1.15 in. in diameter or one 1½ in. rod will carry the thrust. Assuming that each truss will be 22 ft. long and 17 ft. from the post and the load 50,000 lb. the area of each truss must be 32 sq. in. and for 90,000 lb. 57 sq.

in. are required; hence 8 x 10 in. is scant enough.

From C. L. D., Minneapolis, Minn.—In answer to the inquiry of "C. J. M." which appeared in a recent issue, I would say that I have figured roughly the top and bottom chords and find the 1⅜-in. steel bottom chord is the weaker section. The correspondent did not mention whether this rod was round or square; but if round it would carry a little more than 30 lb. per horizontal square foot, provided the threaded portion be upset to 1¾ in. There is, therefore, no need to worry about the strength under ordinary conditions.

If, however, the snow loads are to be severe it would be just as well to make the bottom chord a little stronger, say 1½ in. upset to 1¾ in., and take no chances.

It is not my purpose to criticize this design, though I believe "C. J. M." had his doubts about the practical nature of these trusses when he asked the readers for their opinion as to the "fitness for the place." In that case he may regard this as an answer to his query, as it is so intended, rather than a criticism.

The system of double members forming the top chords seems to me impractical, but it may be of general interest to the readers if the matter is discussed a little now that the query is before them. These members would be difficult of proper construction. The average carpenter would be unlikely to spend time in making them join so very nicely that each would bear its proper share of the loads in the completed truss. He would be apt to leave some joints more open than others, which would be bad for the structure.

To better illustrate just what is meant, the reader should refer to the correspondent's sketch. There are two inclined posts from the top chord down to each shoe, making four inclined posts in all in each truss. Suppose for instance that three of these posts be sawed 1/16 in. longer than marked and intended to be, and suppose the fourth one, which we will say is one of those from nearest the center of the truss down to the shoe, be sawed 1/16 in. shorter than intended to be. It is at once evident that the short member will allow the structure to sag and there is no practical method of tightening this member after the structure is in place.

Even though all joints did butt square together when made, would they continue to have that tendency under heavy snow loads when the shape of the top chords would be bent down slightly out of their original position? I am afraid they would not. It seems to me that one or the other system of top chords would be almost sure to carry all the loads, while the other systems were carrying practically nothing.

For these reasons I would prefer to have the chord members in one system, which in this case would make two joints in the top chords instead of four. Then, no matter if the trusses did sag to get their bearings, it would only be a matter of adjusting the turnbuckles and there would be no need to worry about bearing in all the joints or proper alignment of the trusses.

I do not know that a new design is wanted and at any rate the data as to the nature of the building is incomplete. The sketch which I send, Fig. 2, is merely intended to illustrate my idea of a truss which might be more appropriate for the place—a suggestion to show how a little change might simplify the construction and help improve the general conditions.

A Home Study Course in Structural Engineering

From A. L. N., Angelica, N. Y.—I would like to ask Ernest McCullough to give through the columns of the Correspondence Department the outline of a home study course in structural engineering, starting at the beginning, with an outline of course and the best books for the purpose.

Answer.—In reply to the above Mr. McCullough furnishes the following comments and we would state that the books he mentions can be supplied through the Technical Book Department of *The Building Age*, 239 West 39th Street, New York City.

I assume the reader who asks for an outline of a course in structural engineering really wants a syllabus, in order to take up the study. To begin, a knowledge of mathematics is absolutely necessary. A man may get along with what is given in a usual high school course, but to get farther than a detailer's job he should have something more than this. There are many books written with the word "practical" in the title and supposedly written for self-instruction, but they fail through lack of full treatment and too great condensation, or by being so verbose as to become wearisome.

To study mathematics properly one should have a teacher and, in fact, to study any subject properly one should have a teacher. When it is not possible to pay for private tuition and when it is not possible to attend classes the student may turn to a good correspondence school. If suspicious of the correspondence schools run for profit, although there are some of which no one should feel afraid, there is the University of Wisconsin, which gives instruction by correspondence in many technical subjects, structural engineering included. Correspondence courses in mathematics and mechanics, carrying college credits, are given by the University of Chicago, Chicago, Ill.; Kansas State University, Lawrence, Kan., and by the University of Wisconsin, Madison, Wis.

The man well drilled in mathematics and mechanics should have no trouble reading understandingly any text on building and bridge design, the subjects covered by the term "structural engineering" as a rule. Of late years there has been a tendency to limit the term structural engineering to cover building design only, bridge work being left to the subject of bridge engineering. The two overlap, however, and a man should be able to cover both fields in the lower grades, specializing with experience.

The mathematics necessary include arithmetic, algebra, plane and solid geometry, plane trigonometry, analytical geometry, differential and integral calculus, analytic mechanics, applied mechanics. A man with such training can read with pleasure such works as Greene's "Trusses and Arches by Graphic Methods" (3 vols.), Spofford's "Theory of Structures," Greene's "Structural Mechanics," Merriman & Jacoby "Roof and Bridge

Design" (4 vols.), Johnson, Bryan & Turneaure, "Theory and Practice of Modern Framed Structures" (3 vols.). It would be advisable to start with Maurer's "Technical Mechanics" followed by Hess "Graphics and Structural Design," after completing the mathematics and analytical mechanics. The student is assumed to be engaged in some capacity around an engineering office where considerable information may be soaked up.

Assume that the inquirer cannot attend school and for some reason prefers to be among the self-tutored class and does not wish to enroll in a correspondence course. The writer knows many such but cannot understand their attitude of mind in this era of university extension and numerous opportunities to attend evening classes. However, a course for home study should be as follows, considering a student whose mathematical training stopped at the grade school. He is assumed to be employed in the office of an engineer or architect and therefore obtains practical instruction in drafting. He must first study mathematics and it is, as above stated, difficult to obtain just the right books for this purpose.

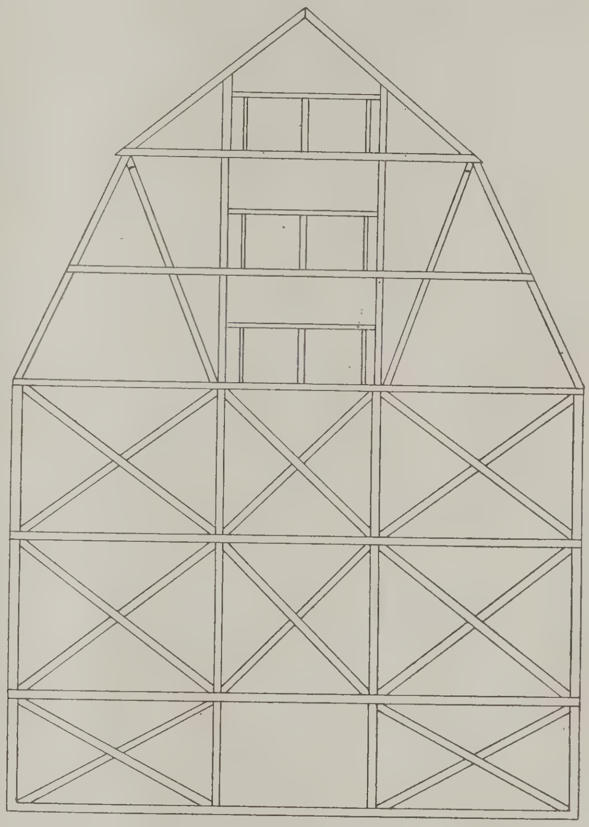
The best books that meet partially the needs of such men are "An Introduction to Practical Mathematics" by Saxelby and "Mathematics for the Practical Man" by Howe. The student needs the two books. It is tedious work using only one book and the two books are supplementary. All men who are self-tutored find it refreshing to turn to more than one book but soon run into the danger that they buy too many and become confused. No more than two books on any one subject should be studied at one time and both books should be completed. It is not difficult nowadays to find a friend near by who can give help at the hard places. The book by Larard and Golding, "Practical Calculations for Engineers" should be studied for the wealth of information it holds on subjects often met with in the practice of engineers. Gould's "Primer of the Calculus" and Barker's "Graphical Calculus" can properly follow. These two books will give a very good knowledge of the calculus notation and enable the reader to understand writers who use calculus. They are not essential and can be left until some knowledge of this kind is needed.

After completing the books on mathematics, and not until then, study "Structural Engineering" by Husband and Harby. There is no American book of exactly the same sort of equal value to the man of limited mathematical attainments. It is English and on that account some men are disposed to reject it, but such nationalistic prejudice should not be permitted to influence the student. Together with this book he should study Thomson's "Bridge and Structural Design." When the two books differ in some points follow Thomson as representative of American practice in preference to the first book. Follow the two books by Thomson's "Typical Steel Railway Bridges." Baker's "Masonry Construction" should follow this work and by the time such a course is completed the student should be far enough advanced in his chosen work to be able to select for himself such other books as he may wish to add to his working library.

A great many young men are working as draftsmen and detailers who never pursued a systematic course of study, but who picked up as the years went by a fairly satisfactory amount of practical knowledge. The good schools are turning out so many graduates at present it is becoming increasingly difficult for the self-tutored man to hold his own, unless he does pursue some such course as that above outlined.

Self-Supporting Barn Roof

From D. P. B., Redford, N. Y.—A short time ago a correspondent signing himself "O. S. W.," Robinson, Kansas, asked for the latest form of self-supporting purlin for barn roof. I am enclosing a sketch of one end of a curb-roof which will show the correspondent the way we support our purlins in this section of the country. The sketch shows the end frame of a barn 40 ft. wide, 150 ft. long, 30 ft. to the square and 55 ft. high. The rafters for the first pitch are 18 ft. and for the top set they are 16 ft.



Self-Supporting Barn Roof

The timbers below the square are 8 x 8 in., while above the square they are 6 x 6 in. The rafters are 2 x 6 in. The first floor, 8 ft. between timbers, is for stalls and the rest for hay loft.

There is an 8 ft. work-way running lengthways through the center of the building and a 12 ft. driveway running crossways through the center.

Drying Wood Samples by Electricity

From E. E. W., Huron, S. D.—Will some of the readers of the correspondence columns of the paper tell me how to dry wood samples by electricity?

Why Do Walls Crack on the Outside and Not on the Inside

From C. K. S., Wayland, Iowa.—Some three or four years ago our schoolhouse burned down and in rebuilding we made use of the same foundation walls which were practically as good as new as high up as the grade line. The 4 ft. above grade, however, was rebuilt with cement blocks up to the first floor, then the outside was built up with home-made cement bricks by the same men that made the blocks. The walls were backed with old clay brick from the structure that burned.

Now we notice there is a check or crack in the brick work in the outside from the lower windows down to the basement windows and also some between the second story to the first story windows. This occurs at every window in the outside walls, while on the inside of the room there are only five or six cracks that show. At the same time no crack is to be seen in the old stone foundations that remained after the building was burned.

Why does the building crack on the outside and not on the inside? Is it because of the cement and clay brick? Will the practical readers express their views?

School Board Contracts

From Contractor, Iowa.—Plans and specifications were made, accepted by a school board, advertised in the papers and bids called for. When the bids were opened they were found too high but certain alternates were adopted, and after the architect going over the estimates with the lowest bidder the amount was brought within the sum specified. The contractor's price was accepted and agreement signed by the president of the school board, etc. Two days after there was an election of school board officers with the result that the old committee is in the minority. Now this new committee wants to serve an injunction on the old and have new plans and specifications made because the direction the school is going to face does not suit them. I may say the general contract as well as the plumbing, heating and lighting contracts have been signed up. I think a thing of this sort is of rare occurrence and would like you to express an opinion."

Answer.—The new committee cannot impair the contractor's rights, as fixed by the contract made with the old board, without subjecting the district to liability in damages for breach of the agreement, if all the steps leading up to the making of the contract were regular, as seems to have been the case from the above statement of facts. But I am of the opinion that the new board is entitled to order any changes, such as the direction which the building shall face, if agreement is made to pay the contractor for any increased expense incurred by him in complying with the order. In any event, it will be safer and better to meet the views of the new board, properly expressed by official action, than to become entangled in litigation, unless the board proves to be so unreasonable as to refuse to recognize the contractor's right to insist upon the terms of his contract, except as such terms may be modified by mutual agreement. A. L. H. STREET.

Rendering a Cellar Water Tight

From H. L. M., Pawling, N. Y.—I have a cellar 25 x 70 ft. in area and 7 ft. in the clear, which I desire to make water tight as I have to guarantee it when finished to be absolutely impervious to moisture. The building has been completed and it is impossible to get at the foundation walls except from the inside.

The stone wall was laid up dry; that is, without mortar, and the inside is painted. In the spring of the year there is sometimes a foot of water in the cellar. There is, of course, some pressure from the outside, as at such times the ground is full of water.

Will some of the practical readers kindly suggest a method or preparation that I can use and guaranteed a water tight cellar.

Payment for Blue Print Details

From Subscriber, Rock Port, Mo.—If a man prepares blue print details of a porch and after they are accepted he builds the porch by the day, is he entitled to compensation for his labor in making the drawings?

What is the custom throughout the country where a carpenter makes his own sketches and drawings in connection with work such as that described above?

Details of a Flour Bin or Kitchen Cabinet

From O. R. H., Sedalia, Alta.—Will some practical reader of the paper send for publication sketches of a well-constructed flour bin or kitchen cabinet. What I want especially is the proportion of the bin so that it will balance equally at the different positions. I want something similar to what a carpenter is often called upon to build in the house.

Laying Terrazzo Floors

From L. J. R., Waterbury, Vt.—I have been a subscriber to *The Building Age* for several years and come to the Correspondence Department for some information in regard to Terrazzo floors. I would like to know what kind of cement to use, what proportion of cement and marble for the mixture, how to prepare the bed and any other information that may be pertinent.

Construction of a Baker's Brick Oven

From W. S. W., Beverly, Mass.—Being a reader of *The Building Age*, I come to the Correspondence columns to see if I can get any information regarding the building of a baker's brick oven 14 x 16 ft. in size. If any reader can give me points as to how the work should be done I shall greatly appreciate the favor.

Laying Out Sash and Doors

From O. P., Belle Vernon, Pa.—Will some of the practical readers of *The Building Age* tell me how to lay out sash and doors, also how to properly set inside door jambs?

Treatment of Ionic Pilaster

From E. J. H., Norwich, N. Y.—Will some of the architectural readers of *The Building Age* explain through the Correspondence columns what treatment should the pilaster be given at the cap and base in the case of an Ionic column as shown in the sketches Fig. 1. The foreman on the job where I am working insists that the cap and base follow around the pilaster, but the question is how to do this on Ionic, Corinthian and Composite Orders?

Answer.—The request of our correspondent was submitted to Alfred Auslander, author of the serial articles entitled "Lessons in Architectural Drawing for Beginners" which ran through these columns some time ago, and he says in reply:

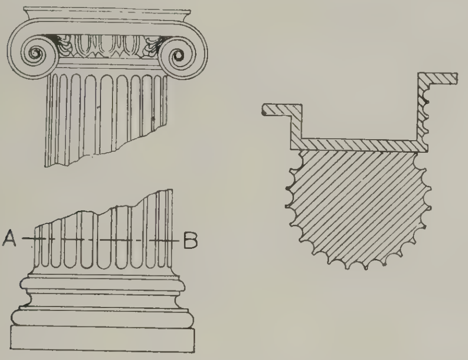


Fig. 1—Sketches Submitted by "E. J. H.," of Norwich, N. Y.

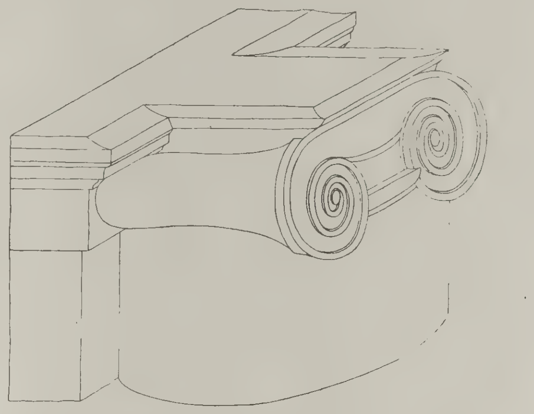


Fig. 4—Isometric View of Plain Ionic Cap

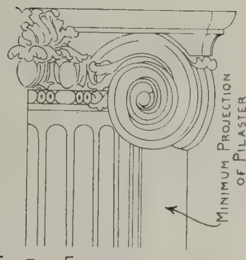


Fig. 3 — Elevation

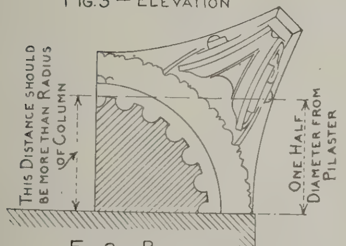
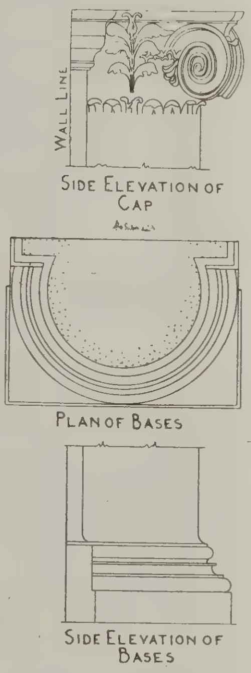

This Distance Should be More Than Radius of Column
One Half Diameter from Pilaster

Fig. 2 — Plan



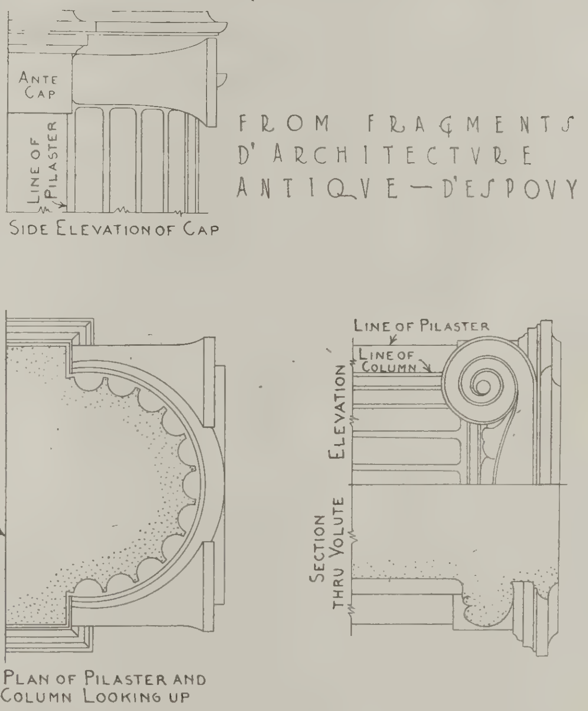


Fig. 5—Drawing taken from "Fragments of Antique Architecture"

Treatment of Ionic Pilaster—Figs. 2 to 4 Sketches Submitted by Mr. Auslander

The conditions as shown by the correspondent's sketch are but rarely found in practice; in fact, I do not know of any such condition where the width of the pilaster is the same as the diameter of the column and I am frank to admit that conditions where the width of pilaster is equal to the diameter of the column in the Ionic as well as in the Corinthian and Composite orders will not be called good architecture.

The foreman on the job is somewhat correct in his assumption that the cap and base are to be returned and follow around the pilaster, but in none of the three mentioned orders is it possible to do that since the side of the column cap is entirely different from the front.

Where an angular cap is used such as a Scamozzian, illustrations of which will be found in pages of *The Building Age* advertising wood carving, columns, etc., the sides of the column cap are the same as the fronts and the volutes do not project as much in the middle of the column as on the sides. In this case it is proper to return the abacus molding of the column cap and carry it around the pilaster, but even in such case the reader will find it necessary to project the cap of the pilaster far enough to receive the projecting molding below the abacus. Columns, however, never project just half of their diameter from the pilaster face but generally a little more, even up to three-quarters of their diameter, which by the way is correctly indicated on the sketch submitted by "E. J. H."

In angular column caps the volutes grow out from the column center and if the projection is three-quarters it is readily seen that it will be quite necessary to provide some surface to receive such out-growing volutes as indicated in Figs. 2 and 3 of the accompanying sketches.

In a plain Ionic cap such as shown in the sketch submitted, the sides of the column cap will show the large scroll diminishing toward the side center line of the column in form, say, a half baluster, the end of which baluster must have a surface to be received. This is clearly indicated in the isometric view, Fig. 4.

The pilaster cap has therefore plain moldings and a plain surface to receive the volute ends. A cap of this kind is called an Antae cap. The capitals of the Antae never corresponded in olden times with those of the columns, though the moldings of the Antae were more or less enriched as the order had more or fewer decorations. Strictly speaking Antae differ from pilasters not only in their capitals but also in their situation.

In the Temple of Minerva Pollias and the Temple of Apollo Didymaeus, in Ionia, the capitals of the Antae have a strong resemblance to those of the columns, they having even volutes though not of the same proportion nor depending in any way.

In later periods pilaster caps based on the above received entirely different moldings from the column caps and were then called Antae caps. Such pilaster caps were used in connection with columns to receive the column cap molding as shown by the drawing Fig. 5 taken from "Fragments D'Architecture Antique" by D'Espouy, or shown by the drawing of modern work used in the Altman building designed by Trowbridge & Livingston. In this drawing we clearly indicate in the section through the volute its projection from column face and also the necessary projection of the pilaster and its cap to receive the volute. The side elevation shows the volute butting against the pilaster cap and the plan, section and elevation show the projection of pilaster.

If it is possible for "E. J. H." to widen the pilaster or to move out the column far enough to clear with the volute the pilaster cap he will obtain a good architectural treatment; otherwise it will be impossible to treat this properly.

As far as the base is concerned the foreman on the job is perfectly right to ask that the moldings be returned on the pilaster, although it is not absolutely necessary to do so as the pilaster could receive a plain base projecting far enough to receive the column base—a treatment similar to that shown at the side elevation and plan of bases taken from the Altman building.

Finally I would suggest if the column is fluted that the flutes of the pilaster be omitted.

Overcoming the Soft Coal Nuisance

From R. A. W., Huntington, W. Va.—I have always followed the Correspondence columns of *The Building Age* with much interest and have derived great benefit from what has appeared therein. There are one or two points upon which I would like to obtain information from fellow readers, and the ultimate solution of them may prove of considerable interest.

Upon the completion of a large frame house situated some distance from the city it was noticed that the soot from the soft coal used had been deposited all over the exterior of the building. In this section of the country natural gas is used for fuel and lighting purposes and one does not often run up against the "smoke nuisance." The house in question is in a section where no natural gas lines have yet been laid. What I want to know is if any one can tell me of a contrivance which can be placed in the flue or on top of the chimney, or of some remedy to prevent the soot from spreading over everything. The house is situated upon a large hill and so is exposed to winds from all directions.

Estimating Cost of Carpentry Work

From A. W., Detroit, Mich.—I would like it very much if some of the practical readers would explain through the Correspondence columns just how carpenter-contractors estimate the time required to do the carpentry work on a certain job, say, for example, a two-family brick veneer house, each family having five rooms and bath. I want to know what rule is the best to follow in estimating the time required to do the carpentery work on this building.

Relative Cost of Interior Trim

From D. E. H., Philadelphia, Pa.—Will some of the practical builders answer the following query: Assuming that the cost of the trim for one house would be $300 using brown ash or calico ash, as it is sometimes called, what would be the approximate cost for the same amount of trim in chestnut, also in basswood and yellow pine.

Making a Party Wall Soundproof

From R. J. S., Maspeth, Long Island, N. Y.—Will some of the experienced builders tell me how to make a party wall soundproof? My idea of the job is to nail plaster boards on the studs and then fill in the space with cinder concrete. We must have 4 in. of fireproof material between the studs.

Finding Radius of Circle

From O. E. F., Kearney, Neb.—Referring to the communication from "C. H. S.," Painesville, Ohio, which appears on page 63 of the April issue of the paper, I would say in regard to the radius of segment that it will often be found more convenient and accurate to use the following formula, utilizing the lettering in the sketch of the correspondent in question

$$\frac{(AC)^2 + 4(BE)^2}{8\,(BE)} = R.$$

It is essential, of course, that all dimensions be of the same denomination; that is, either feet or inches.

If AC equal 8 ft. and BE 12 in., then

$$\frac{(96)^2 + 4(12)^2}{8(12)} = 102 = 8\text{ ft. }6\text{ in.} = R.\text{, the radius}$$

without drafting.

When the Builder Mixes His Concrete—II.

Construction of the Mixing Board—Various Proportions of Mixture—Measuring the Materials—Rule for Hand Mixing

By Hee H. See

ONE of the first things needed for mixing the concrete is a mixing board. This should not be too small—not less than 10 ft. square if there is much to be mixed. A temporary board may be formed of a number of floor joists as it is not necessary to cut them to length and the mixing does them little damage. Lay down 10 or 12 joists side by side on three supports that have already been brought level; cram them tight together to prevent the liquid cement running away through the cracks and nail the two outside pieces to the supports. The others do not need nailing. It is always best to nail two strips along the sides of the board to prevent the material rolling off, though these strips are often omitted.

We have at present in our equipment a mixing board constructed in three sections or panels. It is made of 1¼ x 4 in. tongued and grooved pine flooring. Each panel is 3 ft. wide by 10 ft. long, making a completed board 9 x 10 ft. in size. It has three 1 x 6 in. cleats on the under side to which the flooring is very thoroughly nailed. Two pieces of 1 x 6 in. are nailed as side boards and three pieces of 3 x 4 in. as supports. These latter have blocks nailed on their ends so that after the panels and side boards are arranged in place wedges may be driven in to hold all together. A cross-section of this board is shown in Fig. 6 of the accompanying sketches.

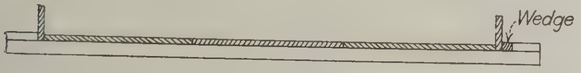


Fig. 6—Cross-Section Through Mixing Board

This board is large enough to mix a yard of concrete. It can be easily carried by six men, one at each end of each support, or by less if it is taken to pieces; is always ready for use and takes up but little room when not in use. It was made some 18 months ago, has been in frequent, but not constant, use ever since and most of the damage it has received has been more from rough handling than from actual work. There was some doubt as to its lasting qualities at the time it was constructed, but our next board will be built along the same lines, but it will be made 1 ft. wider.

Perhaps no phase of concrete work has received more attention than the proportion of the various mixtures. It would seem that mixtures have been figured out to meet every possible condition, but the practical man knows that this theoretical information must not be too blindly followed.

Take, for example, the case of the 1:3:6 mixture; that is, one of cement, three of sand and six of crushed rock. If the rock is crusher run—all sizes, just as it comes from the crusher—it may be possible to mix a good concrete of this proportion. If the rock is all screened to one size it may not be at all possible. To make reasonably smooth finished concrete there must be a little more than enough sand to fill all the voids or cavities in the crushed rock. Rock that is all screened to one size requires more sand than that which is crusher run. Whether it will need 3, 4 or more of sand depends upon the coarseness of the sand, the size of the rock and to a certain extent the thickness of the wall that is to be built. The proper mixture can only be positively determined by actual trial.

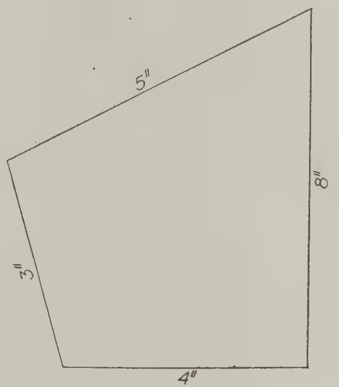


Fig. 7.—The Problem the "Boss' Gave the Apprentice

When the Builder Mixes His Concrete

When the writer was an apprentice, if work became a little slack the boss would sometimes endeavor to keep him out of mischief by setting him simple little problems in geometry. He remembers once getting a rough diagram like Fig. 7 with orders to cut out two pieces of board to that shape and measurement. I suppose the reader can at once see what is wrong with this problem. If he cannot let him set to work to mark it out and he will soon say, as the writer did, "some of these measurements are wrong," and that is just the trouble with some of these copy-book concrete mixtures.

It is generally conceded that too great a proportion of sand makes a weaker—though smoother—concrete than too great a proportion of rock, but it is certain there is a proportion of sand and cement beyond which it is not safe to go. It will depend somewhat upon the quality of the sand, but as a general thing if we find the mixture called for will not make a smooth finish, rather than increase the quantity of sand much beyond a 1:3 proportion we prefer to decrease the quantity of crushed rock.

With all this said, however, we have to admit an inclination to the belief that too much stress is usually laid upon the proper proportioning of the mixture. The writer has seen thousands of yards of concrete mixed from a common run of gravel just as it was dug from the creek. Concrete made from it has been used for every conceivable purpose and has been mixed under every conceivable condition, both by hand and machine. The results in all cases were universally good and with the exception of some cracks due to contraction not a single failure of any kind has been recorded.

Much Stress Laid Upon Proportioning the Mixture

The proportion used is four sacks of cement to a yard of gravel and while that may at first sight appear to be a rich mixture it is nothing beyond the average. Figuring a sack of cement as one cubic foot we have approximately one of cement to seven of gravel, while the 1:3:6 mixture apparently gives us one of cement to nine of gravel—crushed rock and sand—yet the 1:3:6 is the richer mixture of the two, because the sand may be mixed with the crushed rock without increasing its bulk, making the second mixture a 1 to 6 instead of a 1 to 9. That is one of the paradoxes of the concrete business. You take a yard of screened rock, half a yard of sand, four cubic feet of cement, several pails of water, mix them all thoroughly together, and you get a shade less than a yard of concrete measured in the "form."

To sum up this matter of proportioning the mixture I wish to say that while on large work it may pay to make exhaustive tests and careful measurements, in order to avoid wasting cement on a small job with the price of cement as low as it is and the price of labor running up, it pays better to use a little more cement and a little less calculation.

Measuring the Materials

For measuring the materials we seldom use anything other than a wheelbarrow. This method is condemned by many as being inaccurate, though why it should be considered more difficult to fill a wheelbarrow level full than it is to fill a box or any other form of measure is difficult to determine. To ascertain the capacity of the wheelbarrow make an open box 3 ft. square inside measurement and 10 or 12 in. high; fill a wheelbarrow with gravel, dump it into the box and level off. The number of inches of gravel now in the box divided into 36 will show how many wheelbarrows are needed for one yard. For instance, if one wheelbarrow of gravel will fill the box to a depth of 3 in. the wheelbarrow has a capacity of 1/12 of a yard and when using four sacks of cement to the yard it means just one sack to every three wheelbarrows and without any other measuring you are now prepared to mix as much or as small a batch as occasion demands.

It may be better to measure the combined contents of several wheelbarrows and of course the foregong has reference to the use of a gravel mixture, though where sand and crushed rock are used wheelbarrow measurement is just as easy.

Objection has been made that it is difficult to get men to always fill the wheelbarrows just to the correct level. The competent executive is able to get this done just as he does all other things—by using tact and keeping careful watch. One easy way to handle this problem where there are sufficient men is to have enough wheelbarrows to hold one entire batch and let one man fill them all while the others are mixing the batch on the board.

This is perhaps a good place to mention an important rule that should be observed by all those who mix concrete by hand. Never, where it can possibly be avoided, wheel concrete after it has been mixed. Get the materials as near to the job as possible and then endeavor to place the mixing board so that the concrete can be shoveled directly from it into the "forms" moving the board around the form as often as necessary. More time and material can be wasted by handling mixed concrete in wheelbarrows than in any other part of the work. If you mentally run over the different operations necessary to the handling of concrete in this manner you will at once realize the truth of this statement.

The Amount of Water Required

At one time a great deal of attention was paid to the amount of water needed in the concrete mixture. Whether the mixture should be wet or dry was the theme of some heated arguments, many eminent authorities voting for the least amount of water possible. Only those compelled to mix and place concrete under the supervision of the eminent authorities in question really know how little that amount of water could be. Since then it has been conclusively proven that the wetness of the mixture has little effect upon the final result and as the wet mixture is by far the easiest to mix and place that is the one most often employed.

The only advantage obtained from a dry mixture is quick setting and about the only class of work in which it is much employed at the present time is concrete floors and sidewalks. These are generally composed of several inches of common concrete as a base or foundation on which is placed a finishing coat of cement and sand from ½ to 1 in. thick. By making the foundation a very dry mixture—about as wet as damp earth—it can be tamped and leveled into place and the finishing coat at once applied. The latter is mixed very thin and the porous nature of the dry material under it causes a good union between the two. The nature of the material underneath also helps to dry out the top coat and soon makes it ready to "trowel off."

For reinforced work concrete is mixed wet enough to pour; for other work not quite so wet but sufficiently so that it requires no tamping other than can be done with a shovel.

(*To be continued*)

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Death of D. V. Purington

In the death of Dillwyn V. Purington, which occurred at his winter home in Ocean Springs, Miss., April 2, the brickmaking interests of the Middle West lost one of their most prominent representatives. Mr. Purington was born in Sidney, Maine, January 2, 1841, and went to Chicago in April, 1869, where he engaged in the lumber business. In April, 1872, he began the manufacture of brick and was the founder of the Purington-Kimbell Brick Company. He took a prominent part in rebuilding the city of Chicago after the great fire which destroyed so much of it in 1871 and in 1890 he organized the Purington Paving Brick Company of Galesburg, Ill. He served as president of the National Brick Manufacturers' Association and also of the Builders' Club, of Chicago, Ill.

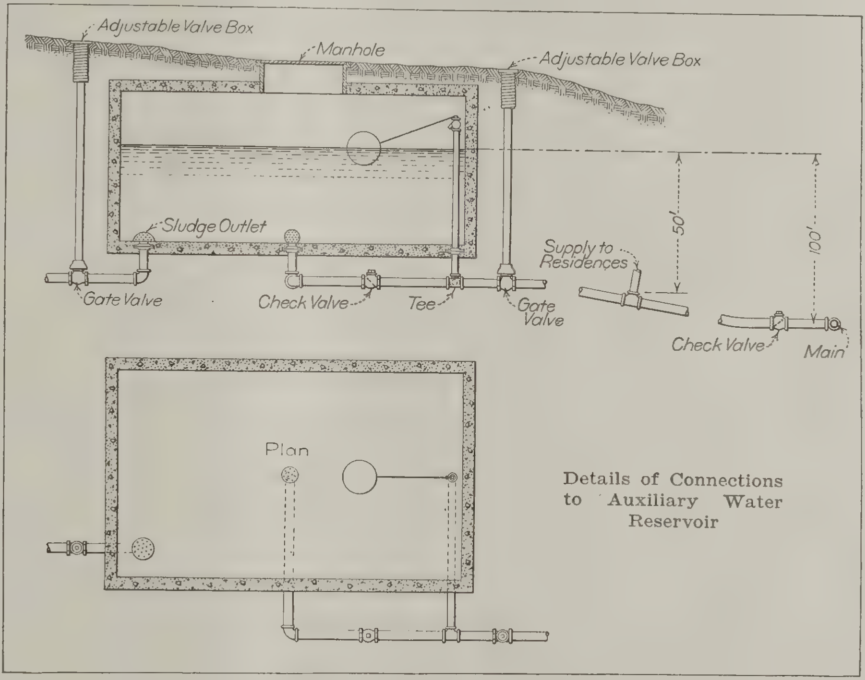
Typical Country Plumbing Installations

Compensating Tank for Buildings Situated at Varying Elevations and Supplied by Gravity System from Spring

WHEN a group of buildings is supplied with water by a gravity system and one or more of the group is situated at a high elevation, there is a possibility that in periods of drought the higher buildings will suffer from a shortage of water at certain times of the day. This condition will not be evident if the main reservoir from which the supply is taken is large and at a high enough elevation to compensate for any excess in draught in the lower buildings at such times as the water is entering the reservoir in less than normal quantities.

It is fairly common, however, to find the supply taken from a spring at an elevation very little above that of the highest building and should the flow decrease to any considerable extent the supply to the higher buildings will only be good in the night time when the demand in all of the buildings has fallen to the minimum. In this event a compensating reservoir in which water may be stored in the night time for the use of the higher buildings may be constructed. The accompanying illustration shows how the arrangement of valves and connections may be made.

It is not necessary that an underground tank be used, although this ensures a supply of water always cool and pleasant even in the hottest weather. A steel or cypress tank may be used with equal advantage if so desired.



Details of Connections to Auxiliary Water Reservoir

Typical Country Plumbing Installations

The illustration shows a concrete tank with a flat roof of reinforced concrete in which a manhole is placed. The tank is situated approximately 50 ft. above the level of the buildings to be supplied while the main supply pipe from the reservoir supplying all of the water is 50 ft. below this connection. The spring and main reservoir are, of course, at a level still higher than the compensating reservoir, but when the greatest amount of water is required the pressure in the system is insufficient to raise water to the highest buildings.

Therefore a connection is made to the pipe and carried up to the new tank with a check valve placed near to the connection as shown. Another check valve is placed on the pipe before the connection to the tank is made, but in this case the check swings in the opposite direction. The reason for this is that a ballcock is placed on a branch supply carried into the tank and continued above the water line. When the pressure in the main pipe is at its highest in the night time water rises freely through this line and the compensating tank is filled. As soon as the desired amount of water is delivered the ball valve closes and prevents waste.

The upper check valve prevents water entering through the lower connection and the lower one prevents its falling back into the main line when the draught begins again at the lower buildings. The result is that a sufficient amount of water is stored each night to cover the demand of the next day, and so any shortage in the supply is made less evident. If, of course, the flow from the spring falls off so much that the actual amount available is less than that consumed each day by all of the buildings in the group such a compensating tank will be of little use, but it is seldom that such conditions are encountered, though common to find the pressure temporarily reduced so much that a sufficient supply is not to be had.

The tank is also provided with a sludge cock so that it may be cleaned at intervals and a gate valve is placed on the supply line outside of the walls or inside if preferred, so that the supply may be closed should repairs be necessary. Both valves are provided with adjustable "curb boxes" with square headed iron keys. If it is desired to place the valve inside the tank the pipe should enter through the side walls.

To make a sound joint with the concrete it is advisable to fit a flange on the pipe at such a position that it will come at the center of the wall. Flanges made of cast lead in two parts afford satisfactory service in this respect, and it is seldom that a leak will be experienced at this part when such are properly fitted. Copper strainers should be placed both on the supply and sludge outlets. These should be of generous size, so that no interference with the flow will be made. A ball valve of the compensating type should be used to prevent water hammer being set up in the supply pipe and, if possible, the supply pipe from the main to the tank should be run without depressions which might cause air-locking.

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Sinking Skyscraper Foundations Under a Hotel

A very interesting piece of work is now in progress on the site of the Victoria Hotel which covers the south side of the block on Twenty-seventh street from Fifth avenue to Broadway, New York City. The work consists in sinking the foundations for a 20-story skyscraper before the old hotel building on the site has been removed. The usual method of procedure has been to entirely demolish the old building and remove the débris before commencing work upon the foundations for the new structure, but here caissons were sunk and for several months the human ground-hogs have labored far below the street level. The present is probably the first instance where the foundations for a new building have been sunk simultaneously with the wrecking of the old structure. The reason for the present method of procedure was to save valuable time on the part of the contractors putting in the foundations. Until the new building is erected the syndicate will lose hundreds of dollars a day in carrying charges and every effort will be made to finish it in time for a renting season. The problem that confronted the contractors therefore was to have the building completed as near a renting season as possible and if time could be saved on the foundations the building could be made ready for occupancy by January of the coming year.

The problem was laid before the engineers of the Underpinning and Foundation Company who had not before built a foundation under just such conditions as those described. They solved the problem by deciding to sink reinforced concrete piles grouped together in such a way as to constitute 63 piers. Many obstacles confronted the workmen after operations were commenced, for 5 ft. under the Fifth avenue end of the hotel a small stream of water was encountered. It is an arm of a brook that wormed its way through the north end of Madison Square Park and the East Side entering the East River at First avenue and Seventeenth street, which is now two blocks from the river's edge. At the Broadway end of the hotel site rock was encountered, so blasting had to be resorted to. This was a delicate operation as much of the hotel is suspended on beams and a heavy charge would have brought the seven-story building down upon the men at work below.

Operations in sinking the piles began the second week in March. Each steel shell of a pile is 12 in. in diameter and 50 ft. in length and these were slid through the store windows on the Fifth avenue end of the building and then through a wide opening in the floor down to the cellar. There are 680 of these piles which are being sunk to bed rock by means of a 3000 lb. steam hammer. At many points the bed rock is 50 ft. below the surface. The piles are grouped in piers of from 9 to 14, according to the weight the pier is expected to sustain, and there will be 63 of these piers on which the skyscraper will rest. Each pile is capable of sustaining 100 tons with safety and the 680 will therefore sustain a load of 68,000 tons.

When the piles have been driven to bed rock they are cut off the proper distance from the top by an oxy-acetylene torch about a foot from the bottom of the 10-ft. pit which had been dug before the pile was driven, after which they are cleaned out by means of compressed air working under a pressure of 150 lb. per sq. in. After the shells were cleaned out three steel rods 2 in. square were set in the pile and the latter filled with concrete from a large mixer set up in the wine cellar of the old hotel. After the pile had been filled the pit was also filled with concrete intersected every half foot with a row of steel beams, each row running at right angles to the other so as to form a substantial grillage.

In doing the work the old hotel plant supplied the steam for the steam hammer and all the electricity used for lighting and power while the operations were under way.

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Lumbermen's Building at Panama Exposition

The project for the Lumbermen's Building and House of Hoo-Hoo at the Panama-Pacific International Exposition has assumed definite shape and the structure will be erected by the lumber interests of the Pacific Coast. The building will be a unique one-story structure covering a large area and surrounded by attractive gardens. It has been designed by Bernard R. Maybeck, who is in charge of the comprehensive architectural scheme of the new University of California and whose plans for the Palace of Fine Arts—one of the most superb of the exposition palaces—were accepted in a competition of world's artists.

The building itself is distinctly unique and combines the requirements of an adequate exhibition hall for displaying the variety and uses of Pacific Coast woods as well as supplying comforts of a luxurious clubhouse. Provision has also been made for the great national congresses and conventions of the organizations allied with the lumber industry. In fact, the building will be the headquarters for the lumbermen of the world.

Frederic Boegle, Jr., is executive secretary, and has opened offices in the Fife Building, San Francisco, where visiting lumbermen and others identified with the timber trade will be welcome.

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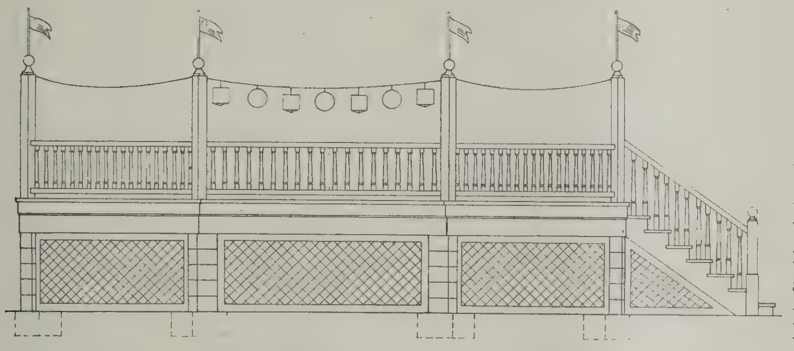
The District Association of Mantel and Tile Dealers was recently organized at Houston, Texas, with George Eubanks, of Atlanta, Ga., as president; W. A. Currie, of Birmingham, Ala., as vice-president, and Thomas C. Harris, of Atlanta, Ga., as secretary-treasurer.

Method of Constructing a Band Stand

A Piece of Work the Country Builder Is Often Called Upon to Execute—Details of Construction

By Owen B. Maginnis

THE inquiries which have appeared in the Correspondence columns of this journal relative to the method of building a band stand will perhaps render the following description of one which was recently erected more or less interesting and instructive to those readers who are called upon to do this style of work. A stand was to be built of octagonal form in an inexpensive yet substantial manner. After the acceptance of the design, which resembled somewhat the drawings presented herewith, the practical work was carried forward in the following manner.



Side Elevation of the Completed Stand

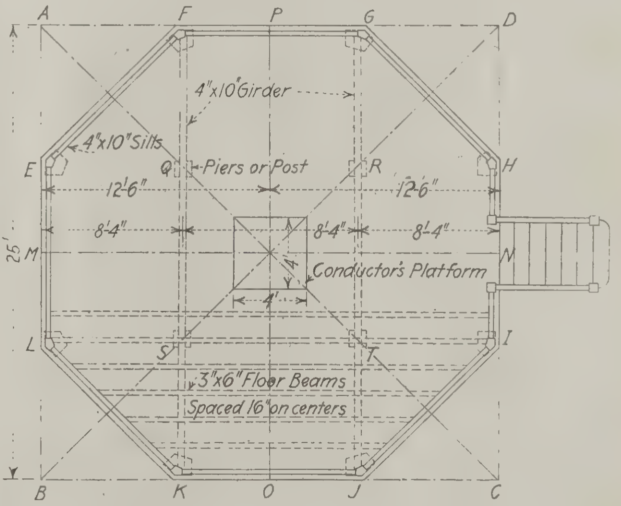
The first operation was to stake out the site and obtain the levels which was done by first establishing the center of the octagonal plan, and regulating it to the desired height by a square wooden stake driven firmly into the ground and a tack or small nail placed exactly in its center. The octagonal figure was then laid out.

The straight cord line M-N was drawn 25 ft. long and 30 ft. away and parallel to the adjoining sidewalk curb. This made 12 ft. 6 in. on either side of the center. From the center and square to M-N was drawn the line O-X-P also 12 ft. 6 in. long both ways from X. This was done by two men with a 16 ft. rod accurately graded in feet and inches. It might be noted here that a stiff 1 x 2 in. rod is preferred to a tape line for this laying out work.

Through the points M, N, O and P were drawn the lines A-B, B-C, C-D and D-A, thus completing a perfect square with the center X properly located from which to measure and level. The intersecting lines and angles formed by them were found by taking B as center and X as radius and sweeping the arc X-E. Next with A as center and X as radius establish the point G and so on all around until points E, F, G, H, I, J, K and L were determined.

By joining the points denoted by these lines the outer line of the octagonal plan here represented can be laid down, but the measuring and handling of the rod must be accurately done or the resulting figure will be out of shape so that the miters and cuts of the superstructure will not coincide or fit. At the points E, F, G, H, I, J, K and L stakes were driven into the ground and each one leveled on top to the center K by using a 13 ft. straight edge with correct spirit level placed on its upper edge. Should posts be used a stake set to their hight should be driven at X and the top of each post leveled therefrom. Again, if concrete block piers are used as shown in Fig. 1 of the accompanying sketches the leveling process would be the same.

By stretching cord lines from each stake their intersections within the figure will locate the central points or axes of the piers necessary to carry the 4 x 10 in. girders from F to K and from J to G. These, of course, must all be leveled from X where a pier or post may also be set and diagonal supplementary girders placed for extra strength. The exact position of each can be verified by using X as center and a radius rod making sure that the eight sides of the octagonal figure are all of the same length and the angles equal.



Plan Showing Method of Laying Out the Work

Method of Constructing a Band Stand

The posts should not be less than 8 in. in diameter at the smaller end. They should preferably be thoroughly seasoned locust or chestnut and set into post holes deep enough to carry their lower ends below frost line, probably 3 ft. 6 in. would be sufficient. If piers of concrete blocks be used they should not be less than 16 in. in the area of their horizontal section and should have their outer faces at the angles flush with the sides of the octagonal plan.

Concerning the timber for the superstructure what here follows is in brief a bill of material.

Yellow pine or spruce girders F-K and G-K 8 by 10 in. by 10 ft. long.
Yellow pine or spruce sills E-F, F-G, G-H, etc., 4 by 10 in. by 16 ft. long.
Floor beams 3 by 6 in. by 10 ft. long.
Cypress or white pine corner posts 6 by 6 in. by 8 ft. high.
Cypress or white pine bottom rails 1½ by 6 in. by 16 ft. long.
Cypress or white pine top rails 2½ by 8 in. by 16 ft. long.
Cypress or white pine balusters 1⅛ by 6 in. by 2 ft. 8 in. high.
Stairs of yellow pine 1½ by 12 in. plank.
Flooring tongued and grooved yellow pine 1⅛ by 6 in.
Stair newels yellow pine 6 by 6 in.
Lattice of 1½ by ⅜-in. lath, 1½-in. mesh.

Galvanized iron nails and spikes should be used throughout and greased bolts.

Before any individual piece of framed timber is placed in position it should be painted with a good priming coat to offset the weather. This is most essential should the work be in progress during the winter season and might indeed apply to any wooden building or structure.

The writer is partial to having all framing timbers for the better jobs "planed" as they take paint readily and are easily framed.

Piers and posts must necessarily be set plumb, although a slight batter inwards on the outer surface of those at E, F, G, H, I, J, K and L would help in the way of stability.

Some Details of Construction

The girders should be halved or shiplapped together, straightened and leveled from F to K and from G to J and either bolted or spiked together. Sills must be halved at every octagonal corner or if time be valuable overlapped. The latter method, however, will complicate the framing of the ends of the floor beams a little, but is a good one and saves much cutting and time. All must be accurately set and I should prefer bolted with lag bolts as there is no likelihood of splitting the timber and it means a more solid construction. The floor beams should be spaced 16 in. on centers and set with a slight camber or curve, say 4 in., like the deck of a ship from the center to the sides, in order to allow the rain or washing water to drain off. They should be bridged between girders. The edges of the tongued and grooved flooring should also be painted with a thin white lead paint to resist rot and each board laid to a line with the heading joints, not less broken than 4 ft. apart, driven tightly together and nailed on every beam without bruising the edges which can always be avoided by using a block or driving stake of the same material.

The upper posts should be framed plumb and spiked into the floor beams and the sills also temporarily braced with diagonal strips to the floor beams and sills.

If it be desirable to build the entire base of concrete blocks this can easily be done by giving them full bond and turning joints to fit at the corners. When the foundation wall is up to say 3 ft. in hight inside, the enclosed wall can be filled in with clay and a concrete floor used. By carrying up blocks and finishing the top with coping blocks 3 ft. long an enclosure for performers may be built but this style would be very warm in summer.

The design here represented, however, was erected on a shady site and is without roof, but in an open square or on a beach a roof would be imperative.

The raised platform or stand for the band master or conductor is placed directly in or over the center of the structure and may be built up of the same floor as the stand proper with a frame of 2 x 4 in. or 2 x 6 in. joists. Its plan may follow the outline of the octagon, although most directors prefer the platform square and it may be about 12 in. or 14 in. high and 4 ft. square or from 12 to 16 ft. square to hold a music stand and chair. Benches should be of the steamboat slatted variety, each slat being 1¼ by 2 in. wide of cypress or yellow pine planed smooth with the corners taken off and spaced 1 in. apart to allow rain water to pass through them.

Weights of Different Kinds of Roofing

The weights of different kinds of roofing material as shown in the accompanying table are based on information recently published by the American Sheet & Tin Plate Co. in a pamphlet entitled "Copper—Its Effect Upon Steel for Roofing Tin." Some calculations having a bearing on the average cottage home, as built throughout the country, have been made from the figures in the table to aid the reader in its use.

In many instances the popular type of home is 30 x 35 ft. or thereabout in size, having a roof area of about 1000 sq. ft. With most roofing materials some kind of sheathing is required and a weatherproofing material is laid upon it.

Material	Average per sq. ft.
Corrugated galvanized sheets, No. 20, unboarded	2¼
Copper, 16 oz. standing seam	1¼
Felt and asphalt, without sheathing	2
Glass, ⅛ in. thick	1¾
Hemlock sheathing, 1 in. thick	2
Lead, about ⅛ in. thick	6 to 8
Lath and plaster ceiling (ordinary)	6 to 8
Mackite, 1 in. thick, with plaster	10
Neponsit roofing, felt, 2 layers	½
Spruce, sheathing, 1 in. thick	2½
Slate, 3/16 in. thick, double lap	6¾
Slate, ⅛ in. thick, 3 in. double lap	4½
Shingles, 6 x 18—⅓ to weather	2
Skylight of glass, 3/16 to ½ in. inc. frame	4 to 10
Slag roofs, 4 ply	3
Terne plate, IC, without sheathing	½
Terne plate, IX, without sheathing	⅝
Metal shingles, painted	⅔
Metal shingles, tin	6/7
Metal shingles, galvanized	1
Tiles (plain) 10½ x 6¼ x ⅝—5¼ in. to weather	18
Tiles (Spanish) 14½ x 10½—7¼ in. to weather	8½
White pine sheathing, 1 in. thick	2½
Yellow pine sheathing, 1 in. thick	4

By referring to the table it may be seen that if the roofing material is tin plate, the weight of the covering will be at the outside ⅝ lb. per square foot and for 1000 sq. ft. the weight will be but 625 lb. For a roof of the same size the weight for other materials would be approximately as follows: Metal shingles, 666 to 10,000 lb.; copper, 1250 lb.; corrugated iron requiring no sheathing boards, 2250 lb.; wood shingles, 2000 lb.; felt and asphalt, 2000 lb.; slag, 4000 lb.; slate, 4500 to 6750 lb.; earthen tile, Spanish style, 3500 lb.; plain tile, 18,000 lb.

Experiments in the use of aspen for shingles show that the shingles do not check in seasoning, and that they turn water satisfactorily, but that they are too easily broken in handling.

House of Concrete Blocks and Stucco

A Design Involving a Combination of Materials Which Produce Very Pleasing Results—Cost $4000

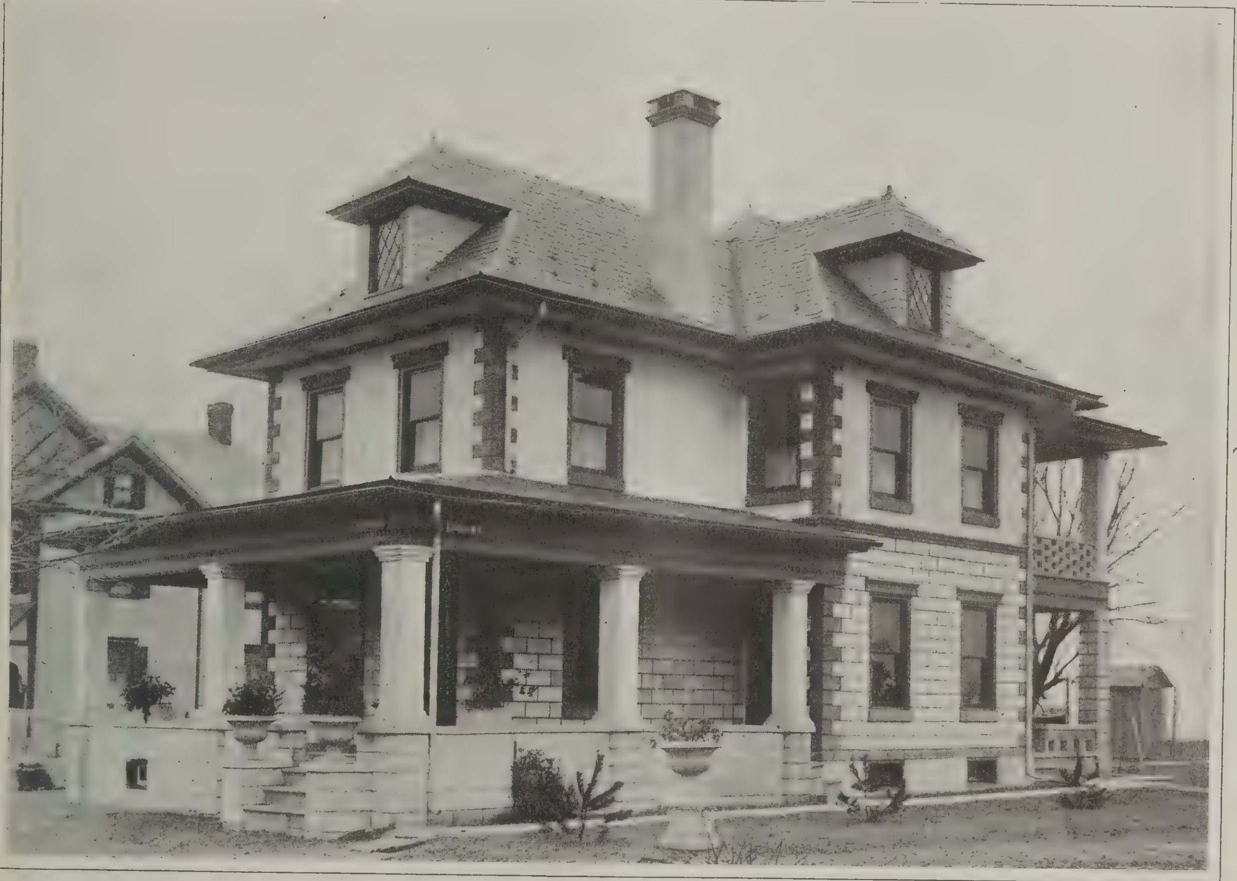
WE take pleasure in bringing to the attention of our readers an excellent example of residence construction in which concrete blocks and stucco for the exterior have been judiciously combined in a way to produce very pleasing results. The first story of the house is built of white faced panel blocks with quoins, belt course and water table of brown stone, forming a striking contrast, and the roof is of tile. The appearance of the finished building is shown in the half tone engraving upon this page.

The second story is built with rough blocks to which there was applied a stucco coating consisting of white cement and white sand in the proportions of three to one and to which a little lime was added. The soffit of the cornice, which from the half tone engraving will be seen to have a heavy projection, is covered with stucco applied to metal lath, the mixture being of the same proportions as the second story exterior.

The rafters are covered with sheathing boards over which is a layer of slater's felt and this in turn is covered with 9 x 18 in. slate. The hips are covered with galvanized hip shingles made by Edwards Mfg. Company, Cincinnati, Ohio.

The floors of the broad veranda extending across the front and around the side of the living room, also of the rear porch are of Terrazzo. In doing the work a rough floor or bed was first made with cinders, sand and cement in a 1:2:3 mixture and on this was laid 1 in. of Terrazzo. There was first put down a border 10 in. wide, this being made of inlaid tile. After the border had become hard the Terrazzo was put on consisting of a 2 to 1 mixture and made up of marble chips with different colored granite ranging from 3/8 in. to 1/2 in. with no fine aggregates. This was rolled down and packed and the floor well soaked with water. The marble shows about 80 per cent. while the gray cement shows only about 20 per cent. After the material had set and the floor become hard it was given a polished finish by rubbing down with rubbing bricks. This it may be interesting to state is the first veranda floor of its kind in the place and it is the admiration of all builders who have seen it.

The first floor of the house is divided into living



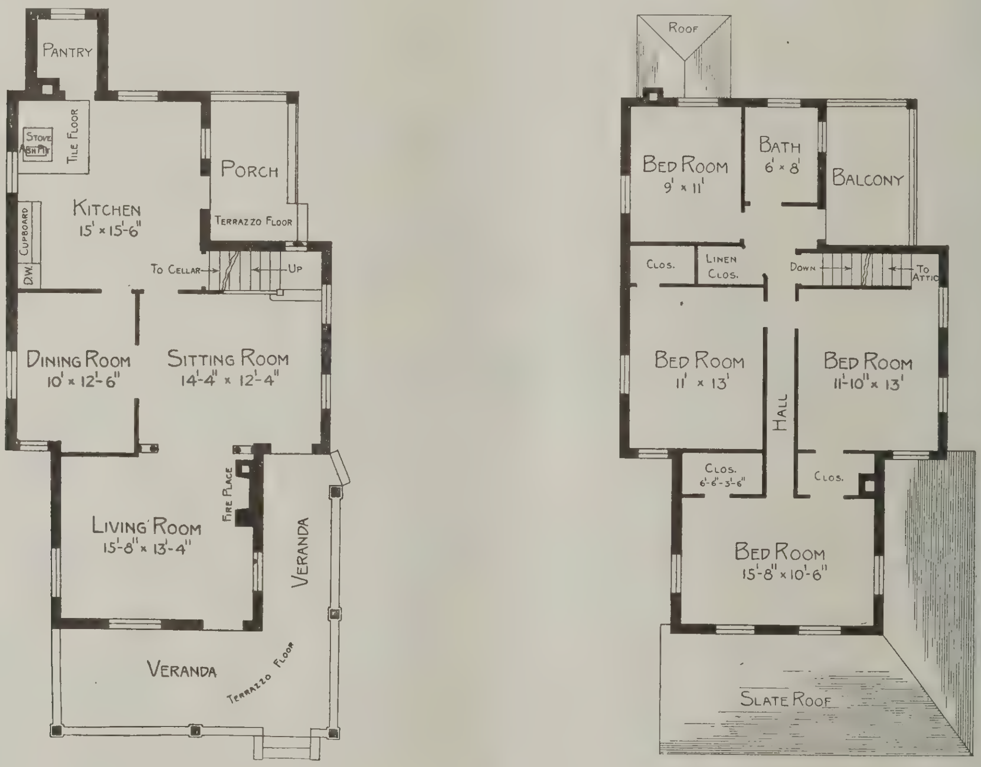
Residence of A. W. Lentz at Lehighton, Pa., Showing Pleasing Effects Produced by a Combination of Concrete Blocks and Stucco room, dining room, kitchen and sitting room, although the latter and the front room may be utilized as practically one apartment if desired.

Communication between the dining room and the kitchen is direct. In the kitchen is a dumbwaiter, cupboard and a range placed in the corner by the chimney. The floor where the stove rests for a space of 6 ft. square is of inlaid tile. The ashes are dumped from the stove into a concrete vault and sifted while dropping down. The vault is of such size that it is only necessary to remove the ashes every six months. This arrangement is regarded by the owner of the house as a decided advantage as it prevents the dust arising from the sifted ashes getting into the kitchen. At the rear is a pantry extension and under the main flight of stairs is the flight leading from the kitchen to the cellar.

On the second floor are four sleeping rooms with a balcony which can be used for sleeping purposes if desired. Each bedroom has ample closet space and at the head of the main flight of stairs is the linen closet. The bath room is at the rear of the house but readily accessible from all rooms.

The first floor joist are 2 x 10 in.; the second and third floor joist 2 x 8 in. and the rafters 2 x 5 in. The floors in the rooms of the first story are laid double, the sub-floor being common yellow pine on which is laid a finish floor of 3/8 in. oak. The floors in the rooms of the second story are of No. 1 yellow pine as are also those on the third floor. The walls and ceilings are lathed and plastered. The hight of the ceiling in the cellar is 6½ ft.; the first story 9 ft., second story 8 ft. 6 in. and the attic 7 ft.

The dining room and the two living rooms are finished in oak. The open stairway, the colonnade between the two living rooms—that is, the sitting room and living room—and the open fireplace are features which have commanded a great deal of attention owing to the fact that this construction is somewhat unusual in that locality.



First Floor Second Floor

A House of Concrete Blocks and Stucco—Floor Plans. Scale 1/16 In. to the Foot

The doors of the rooms on the first floor are veneered red oak of the two panel type, while the doors on the second floor are of yellow pine and of the fire cross panel type. All trim is put on with head casing and dust cap. The house is piped for gas and wired for electric lighting.

The house is heated by what is known as the Honeywell System, and the boiler was made by the Hudson Boiler Mfg. Company, New York.

The concrete blocks used in the construction of the house were made on an Ideal Concrete Block machine of the Ideal Concrete Machinery Company, 1310 Monmouth Avenue, Cincinnati, Ohio.

The house here shown is that of A. W. Lentz, who was the designer, contractor and builder and is located at the corner of Second street and Lentz avenue, Lehighton, Pa. The cost of construction was approximately $4,000.

Frank Sherer & Son of Lehighton had the contract for the plastering and also of the stucco work. The hot water heating system was installed by Ed B. Schmidt, one of the well known plumbers of Lehighton, Pa.

The garage which is not shown in the picture is also built of rough concrete blocks and stucco, the corners having brown stone quoins the same as the second story of the dwelling house. The garage is 17 ft. 4 in. by 21 ft. 4 in. and the floor is of concrete. The roof of the garage is of the same style and construction as that of the house of the owner.

The vases on the lawn and veranda were made by means of an Ideal vase mold manufactured by the Ideal Concrete Machinery Company.

The metal lath used was that made by the North Western Expanded Metal Company, Chicago, Ill.

Testing the Efficiency of Metal Doors

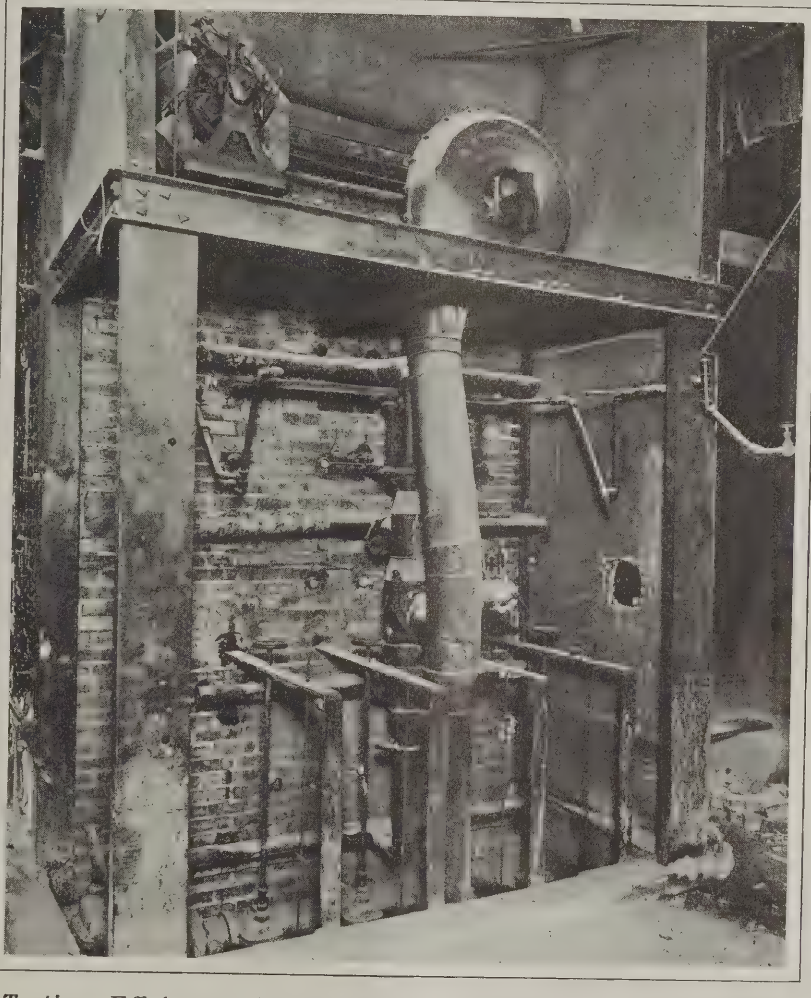
Methods Employed by Chicago Underwriters' Laboratories for Determining the Fire-Resisting Properties of Hollow Metal Doors

WHEN a manufacturer of a fire retardant material or fire extinguisher wishes to have the claims of his product endorsed by experts, it is invariably his custom to send a sample of his product to the officials of the Underwriters' Laboratories in order that this body may examine the construction of the device and also put it to a series of fire tests to prove its efficiency.

The Underwriters' Laboratories have offices in about sixty-two cities throughout the United States, Canada and Great Britain, and maintain headquarters at 207 East Ohio street, Chicago, Ill. The corporation is not in business for profit, but works in conjunction with the National Board of Fire Underwriters, by which the work is carried on. The establishment of the laboratories was primarily to determine the merits or demerits of all devices, systems or materials affecting the fire hazard in the United States, the work being carried to the extent of guaranteeing accurate and uniform decisions.

The work of this organization has a distinct bearing on the activities of the sheet metal manufacturer, inasmuch as sheet metal doors, fireproof metal windows, and other fire retardants allied with the sheet metal industry come within the scope of the laboratory tests. The costs of these tests are defrayed by the manufacturer whose work is being examined.

As a typical illustration of the work of the laboratories the tests have been selected that are given to fireproof hollow metal doors that are manufactured by Eastern and Middle Western concerns. The doors in question are of hollow metal and have frames resembling the ordinary door in appearance and designed for the same class of construction. They are made of No. 18 gauge black sheet steel, with stiles and rails hollow and lined with sheet asbestos, the entire space between the sheets forming the sides being also filled with the same material. The frame is made in two parts—an inner frame which is built into the wall structure, and an outer frame designed for installation after the building is clear of the rougher trades and openings prepared for hanging the door.



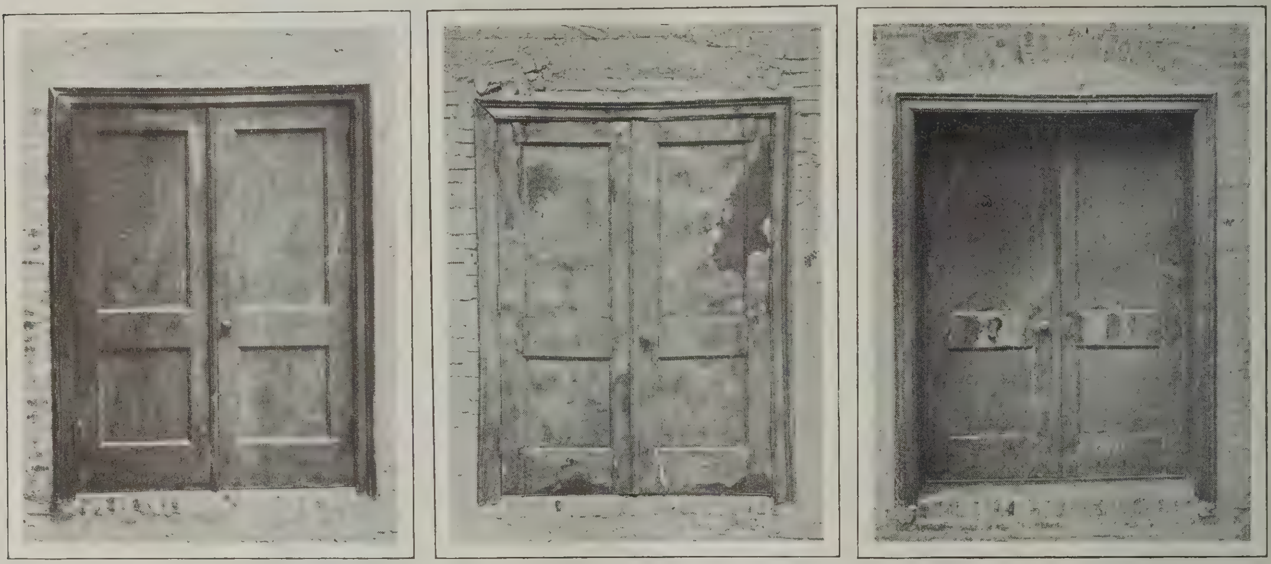
Testing Efficiency of Metal Doors—Gas and Air-Blast Burner Equipment Back of Furnace Chamber

The door and frame are designed for use in brick walls, concrete or tile, and any standard form of sill. When no sill is used the jambs of the inner frame are cut to proper length to allow their being let into the floor to a distance of 3 in. The door proper consists of two stiles, two or more rails, and the panels. The stiles and rails are joined together by hook joints and welding. The edges of the panels extend into the grooves formed in the edges of the stiles and the rails, but are not otherwise secured.

The inner door frame consists of a head and jambs formed of channel-shaped sections of No. 16 gauge steel fastened together at the corners by clips and bolted flanges. The other frame or finished trim consists of sheet metal channels which cover the inner frame and are fastened to it with machine screws. The anchors with which the frame is fastened to the wall are attached to the back of the wall channels. These are the constructive features of the door undergoing the following test, the general appearance of the door being shown in one of the accompanying illustrations.

To determine the manufacturer's claim that such a door is a fire retardant, the essential characteristics are that it shall be a serviceable device of its class, protect the opening against fire, and be so constructed that it will withstand the impact and cooling effects of streams of water while under heat. Thus the method is divided into four classes: Installation, operation, weathering and maintenance.

The first step in testing is to build one of the sample doors into a brick wall as though for an ordinary installation. The ease with which the device can be installed is then determined by observation made during the installation of the door in the walls of the laboratory test furnace. The rigidity of the frame is also noticed after installation, and the determination of the effect of high temperature on frames before, during and after testing is another of the important undertakings of the inspectors in charge. The weathering features are arrived at by an examination of the fit of the frame in the masonry and the general fitting of component parts.


Fire Side Prior to Test
Front of Door After Test
Reverse Side After Test

Testing Efficiency of Metal Doors—Three Views of a Metal Door Taken in Connection with Fire Test

The ease of maintenance is concluded before and after the fire test by noting the effort required to take the doors apart after exposure to fire, and by noting the effects of wear on the doors installed and of doors of somewhat similar construction in daily use at the laboratories.

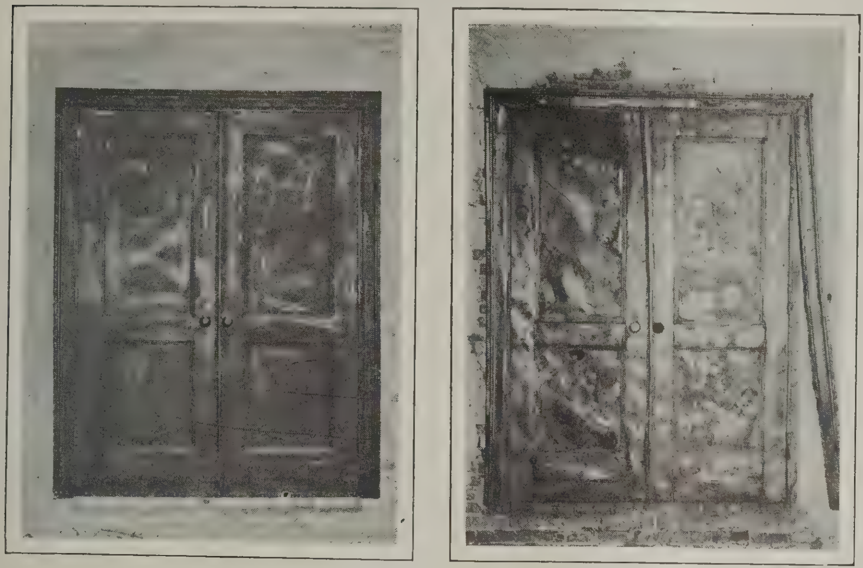
The Laboratories standard fire test for a fireproof door consists essentially of the application of fire to one side of the door which is installed in the wall the same as if it were in actual service. The equipment used for this test is a large gas furnace, the front of which is formed by a movable wall provided with an opening 5 ft. wide and 7 ft. high. The furnace proper consists of a shallow combustion chamber about 12 in. deep by 7 ft. 6 in. wide by 11 ft. 6 in. high, enclosed by a solid brick wall at the back and one side. A small movable wall forms the other side and the test wall, carrying the sample for testing forms on the front of it. The side walls are provided with observation holes glazed with mica. A brick arch, provided with vents leading to a stack, closes the top of the furnace chamber.

The furnace is heated by four gas-blast burners set in a shallow pit at the bottom of the combustion chamber. These burners discharge upward and are supplied with gas and air through mixing tubes entering the furnace at the back. In addition to that supplied to the burners air is also introduced into the combustion chamber through secondary inlets in the back wall of the furnace. These inlets, 34 in all, are evenly distributed over the face of the back wall. The gas is supplied to the furnace through a 6-in. main leading directly from the street and the air by a Sturtevant blower fan driven by an electric motor. Gates are provided for regulating the supply of air and gas.

The average temperature of the furnace chamber is indicated by means of a circulating water pyrometer. This device consists of two loops of copper tubing hung in the furnace chamber through which water flows under a constant head. The average temperature of the furnace chamber is proportional to the increase in the temperature of the water flowing through the piping, thermometers being inserted in the inlet and outlet of the system. This device was calibrated originally by means of thermocouples located in the plane of the piping.

The observation room consists of an enclosure, 9 ft. 6 in. wide and 20 ft. long. One end of this room is formed by a movable wall in which the sample being tested is installed. The other end is closed except for a small door. The sides are formed by rolling shutters, windows in these sides permitting observation of the entire interior.

When the sample to be tested is bricked up in the movable wall, the wall is then drawn up so that it closes the front of the furnace. In this position it also closes one end of the observation chamber, forming a partition between the latter and the furnace chamber. The door being tested is then closed and locked and the fire started. The gas and air supplies are adjusted to produce a soft-rolling semi-luminous flame which completely fills the furnace chamber and covers the sample. The temperatures are increased gradually according to the predetermined temperature gradient by regulating the amount of air and gas supplied. The maximum temperature is attained at the end of the test period, which in all cases is one hour. The maximum temperature applied to a fireproof window is about 1550 deg. F. and that to a fireproof door 2000 deg. F. The behavior of the sample under test is observed from both the exposed and unexposed sides of it.

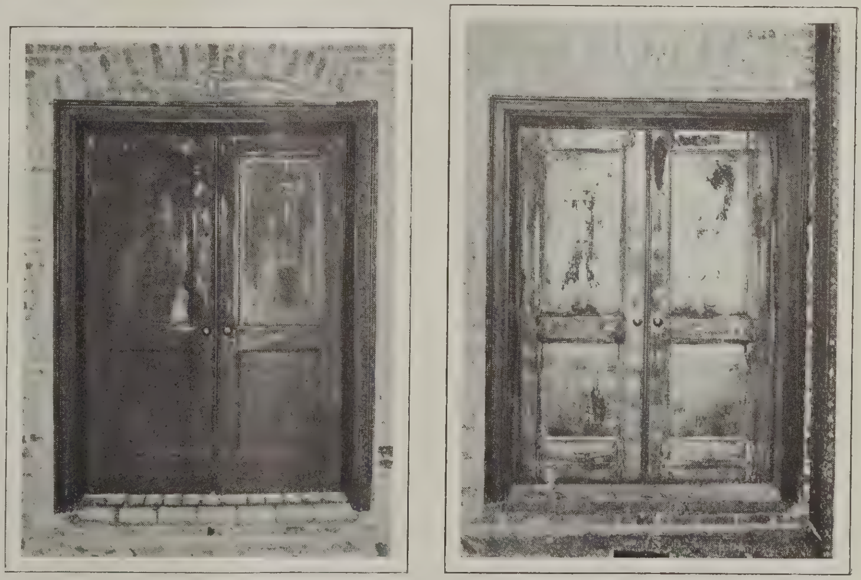


Before Test After Test

Testing Efficiency of Metal Doors—Front of a Metal Door Before and After the Test

The amount of heat transmitted by the door is determined by means of thermometers suspended in the observation chamber and is also roughly indicated by means of strips of cloth suspended in front of the door at distances of 18 and 36 in. These cloth strips may be considered to represent inflammable goods or curtains. At the end of the fixed test period, or when the sample has failed, the catch holding the wall in place is released and the counter weights draw it out from the front of the furnace chamber, at which time the gas and air valves are closed. This concludes the fire test.

The photographs reproduced herewith show the hollow metal doors before and after the fire and water tests. After the door has been in the fire for one hour and the fires extinguished, a stream of water from a ⅞-in. nozzle 20 ft. from the door is applied to the fire side of the door for one minute. The pressure is 60 lb. per square inch at the base of the nozzle.



Before Test After Test

Reverse of a Metal Door Before and After the Test

The equipment used in these tests consists of a ⅞-in. nozzle connected to a short length of 2½-in. hose mounted on a portable upright stand of 3-in. pipe. A gate is provided for controlling the stream and a gauge at the inlet of the short length of hose indicates the pressure. Water is supplied to the stand through a 2½-in. hose connected to a pump.

Throughout these tests the engineers in charge are making notes every five minutes on the action of the fire on the door. Photographs are also taken at intervals and finally the action of the doors under test are recorded and the manufacturer notified of the results. Recommendations, if any, are made and the manufacturer is then allowed to attach the official label provided by the underwriters on all doors built along the lines of the sample tested, provided the door passes the specifications and requirements of the laboratories.

It is the privilege of the Laboratories' inspectors to visit the manufacturers at any time in order to see that doors and other fire retardants are being constructed according to the authorized approval. The inspector can order any device to be torn apart no matter how advanced the construction of the particular article may be. All doors before leaving the factory have the Underwriters' label of approval attached, after an examination has been made by the laboratory experts who are in charge.

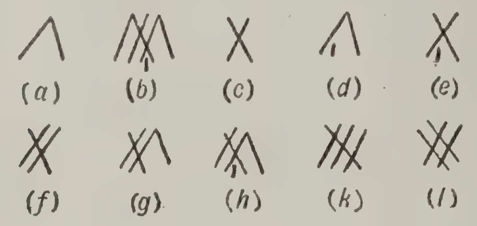
The inspector may often have a hundred or more windows or doors to inspect at one factory, in which case he selects a number at random and examines them minutely regarding the placing of rivets, gauge of metal, etc., and if everything is satisfactory gives his official approval. The windows or doors are also inspected on installation and defects, if any, are duly reported. By this means there is a double check on the class of work sent out by the manufacturer.

The plant at which the tests are made is claimed to be the most modern of fireproof buildings in the country.

It is a three-story and basement building with a frontage of 266 ft. Yard space is provided for huts and the large testing furnace. In all there are 83 persons employed in this institution. It is invariably found that manufacturers are willing to co-operate with the laboratory officials in carrying out the work of inspection and testing, and where recommendations are made they are usually received with expressions of approval, for the manufacturers can but realize that the work of the Underwriters' Laboratories, operating without financial profit, is for greater efficiency among the fire retardant devices manufactured by all.

Race Marks on Timber

There are signs which are common to various branches of science, but few mystic symbols remain to the trade of the carpenter and joiner, says a correspondent writing to "The Journal of the British Institute of Certified Carpenters." There are, however, "Race Marks," and to the uninitiated they are among the remaining mysteries of the craft.



Race Marks on Timber

What is a Race Mark? Here it is, (*a*); another, (*b*); in the first instance it means 5 superficial feet, in the second 35½ superficial feet, and they appear on boards of mahogany, birch, oak, and other hardwoods that have been cut into boards for joinery.

It is customary to so mark them when received from the sawmill, where the logs have been converted. The boards are measured by the yard foreman, and by him marked in such a way that the superficial measurement will be easily read; he, in many instances, will also by the use of a hammer, stamp numbers on the ends of the board, and the quality of the timber will be recorded, the price being varied accordingly; for hardwoods bought in log form by timber merchants are largely speculative transactions, though it must be remembered that 25 per cent. of the cubic contents is allowed for cutting, etc., the latter being a very large item.

Note a few of these "Race Marks":
(*c*) 10; (*d*) 5½; (*e*) 10½; (*f*) 20; (*g*) 25; (*h*) 25½; (*k*) 30; (*l*) 40; and so on.

All boards are so marked when taken into stock, and, when delivered, the delivery note will be made out according to the stock book, so that, when the boards are received from the timber merchant, one must first note that the Race Mark is correct by measuring the board, then see that the delivery note is made out accurately, for in these matters every one is liable to make mistakes, and no one makes them purposely.

Fire Retardant Paints for Shingles

One of the many interesting papers read at the twenty-sixth annual convention of the Master Painters and Decorators Association of Pennsylvania recently held in Pittsburgh, was that on the above subject by Henry A. Gardner of the Institute of Industrial Research, Washington, D. C. The paper was of considerable length and dealt with many phases of the subject including a description of a series of laboratory tests to determine the heat deflecting properties of various types of roofing materials. Miniature houses were roofed with bare shingles, painted shingles, tin and stone. These houses were placed in an oven heated to 150 degrees Centigrade. At the end of 15 minutes thermometric readings were taken and the interior of the houses roofed with stone and tin showed a much higher temperature than those roofed with shingles. The house with the roof covered with painted shingles showed the lowest temperature. On account of the heat deflecting properties of shingles they will probably always find a wide application in warm climates and the point was also made that shingled dwellings are much cooler in summer than ironclad or stone roofed dwellings.

A summary of the conclusions reached were given as follows:

> The shingled roof is highly desirable on account of its durability, light weight, low cost and non-conducting properties.
>
> Shingled roofs are subject to conflagration when they become dry. Hot cinders from chimneys or glowing sparks carried by the wind from nearby fires are common causes of roof fires.
>
> The use of high-grade mineral paints upon shingled roofs eliminates such fire danger. Shingled structures of all types, when properly painted, are not only fire resistant but they are moisture proof and highly ornamental.
>
> The painted shingle dwelling constitutes one of the most desirable types of modern suburban homes.

An Unusual Shingle Order

Business men often receive in their mail, letters which are of a more or less amusing nature, although intended to be serious by the writers. The Southern Cypress Manufacturers Association recently received a letter from one of those unpronounceable places in Alaska, reading as follows:

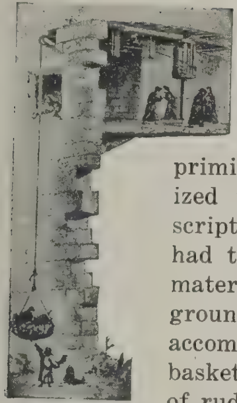
> "Received your farm leaflets. Thanks. Kindly send prices on shingles, 20 in. wide, 1 in. thick and 4 ft. long."

These are certainly "some shingles," but then, it is probable that few manufacturers of this form of roof covering have had an Alaskan experience.

The American forestry association has elected Henry S. Drinker, president of Lehigh University, and P. S. Ridsdale, as its president and secretary respectively.

The Dumbwaiter in House Construction

Some Features Which Render This Device One of the Conveniences of the Modern Habitation



IN olden times the work connected with the erection and equipment of buildings intended for use as dwellings was carried on in the most primitive way and the appliances utilized were of exceedingly crude description. One of the problems which had to be solved was the raising of materials to varying hights above the ground level, and this was ofttimes accomplished by means of a rope and basket in conjunction with some sort of rude windlass. Where such an apparatus was used for hoisting persons and things to an upper story of a building the rope to which the basket was attached would run over a support placed just above the window opening, through which the contents of the basket were discharged, and then extending horizontally along the ceiling would wind around a windlass or winch of peculiar construction. It had very much the appearance of a capstan, but with the drum placed near the ceiling rather than at the floor. The pole or vertical shaft on which the capstan turned extended from floor to ceiling and was revolved by bars placed at right angles to each other a little more than waist high and operated by four men walking around somewhat after the manner one would turn a capstan of present-day construction. Another man stood at the window opening to swing the basket into the room when it reached that level.

From this idea, no doubt carried along through many decades, has been evolved that medium for hoisting supplied from the basement to the upper floors, which is to be found in the modern home and known as the dumbwaiter. While not so essential, perhaps, in private dwellings where the dining room is on the same floor as the kitchen, it is a most necessary adjunct of the apartment house, where the supplies for the various families must be delivered to the respective floors from the basement. The arrangement is such that the dumbwaiter shaft is readily accessible from the kitchen of each apartment, thus greatly facilitating the delivery of goods by the grocer, the baker, the butcher, the dairyman, etc.

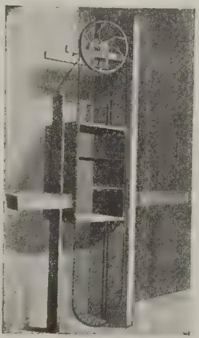


Fig. 1—The "Chelsea" Dumbwaiter

The features involved in the present-day dumbwaiter are such as to enable it to be readily operated from any floor level of the house in which it is installed as well as from the basement. One of the latest forms of dumbwaiter machine is fitted with an automatic brake or lock so that the car may be loaded and will hold it in any position until released by a pull on the hand rope. As soon, however, as the hand rope is released the car remains stationary. This latest and most improved type permits the automatic lock to operate both on the down motion of the car as well as on the up motion. This is regarded as an exceptional feature in automatic brake dumbwaiter machines and the point is made that a car can be over-balanced by the counterweight and still retain the automatic feature. This dumbwaiter machine, made by the Chelsea Elevator Company, New York City, and shown in Fig. 1, has a brake shoe of heavy pattern phosphor bronze with more than ordinary braking surface. The inside of the brake band is turned in the lathe so as to insure a perfect surface upon which the face of the brake shoe works. The center wheel and the flywheel are of gray iron, accurately bored to fit the shaft and secured by means of set screws. All parts are made with special tools and jigs and are interchangeable.

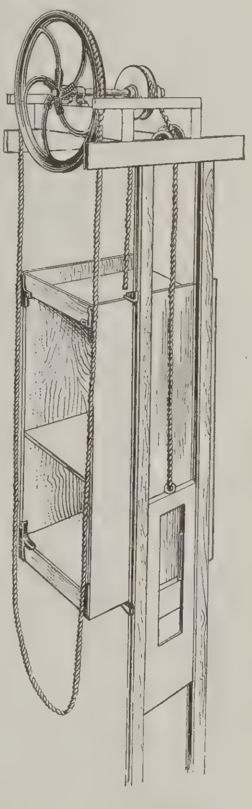
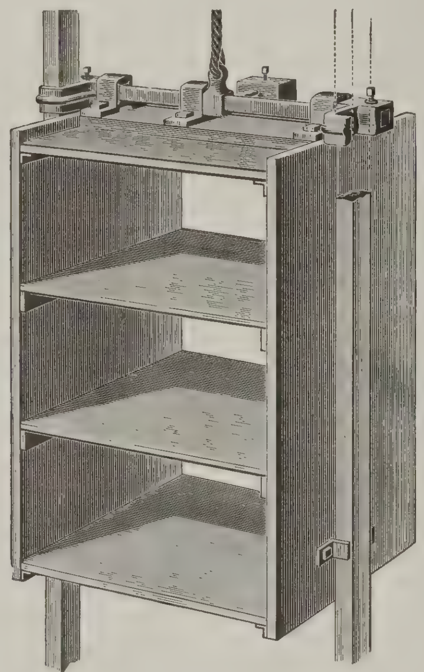


Fig. 2—The "Excelsior" Self-Retaining Dumbwaiter

There is also on the market a self-retaining dumbwaiter which is of such simple construction that anyone with the help of a wrench, screwdriver, hammer and saw can erect the outfit almost as quickly as an experienced mechanic. The car is of seasoned hardwood, natural finish and varnished. The size is 25 in. wide by 21 in. deep, and it is 3 ft. 6 in. in hight. The counterweight can be adjusted to suit the weight of the car by using separate blocks. The machine is self-retaining in that any load placed on the car cannot move until a pull is given the operating rope. The rope is continuous, running over the flywheel to the basement of the building, its length, of course, being determined by the number of stories between which the dumbwaiter is to operate. A pull on one side raises the load and on the other side lowers it, while immediately the rope is released the machine is locked. The counterweight is such that it may be placed either side without change in the machine and can be used on any size car from 14 in. to 22 in. deep by simply adjusting the collar to meet the requirements. The guiding sheaves of the machine shown in Fig. 2, and made by R. M. Rodgers & Co., Brooklyn, N. Y., are contained in special iron hangers which fasten to the same timbers as the machine proper, thus insuring a true running of the rope and leaving more overhead room to reach the parts constituting the mechanism. It also makes less obstruction of light where skylights are used and there is also the advantage of its being easily erected. The rope used for this car and weight is of 2-in. Manila, while the rope for operating the car is of Russia hemp, as the latter wears smooth and does not splinter.

A dumbwaiter provided with another form of automatic safety catch is that illustrated in Fig. 3. This catch is an ingenious device for holding the car firmly in place should an accident occur to the ropes. The breaking of the hoisting rope or cable will cause the safety appliances to automatically grip into the guide strips and prevent the dumbwaiter car from falling and thus avoid the breaking of any dishes or other breakable material that might happen to be on the dumbwaiter at the time. Experience has shown that comparatively few people using dumbwaiters discover the condition of the rope or cable until it breaks. Instead of using the customary springs the catches are thrown into action by gravity, thus making it more reliable than would otherwise be the case. This form of dumbwaiter is known as the "Columbia" and is made by J. G. Speidel, Reading, Pa.



The Dumb Waiter in House Construction—Fig. 3—Car of the "Columbia" Dumb Waiter

In strictly private dwellings the dumbwaiter is often of a self-lifting nature and is intended to operate between the basement and the first floor. It is in reality a balanced movable pantry, so that when it is down the top of it comes flush with the dining room floor, or whatever the room may be. Consequently it is out of sight and out of the way, while the top forms part of the floor of the room and can be walked upon the same as any other part of the floor. This style of dumbwaiter is very desirable where limited room would not permit of another form. A self-lifting dumbwaiter of this character, made by the Blake Elevator Mfg. Company, Sidney, Ohio, is fitted with new improved foot brakes which have been substituted for the older type. The car is made of hardwood, has five shelves, two of which are removable, thus allowing extra space for large articles. The car may be fitted with a solid panel door, or one having strong wire panels, thus permitting free circulation of air and excluding flies and insects. When it is desired to bring the car up into the room it is simply necessary to press with the foot upon the pedal which runs through a hole in the floor, releasing the car, which rises through the medium of adjustable weights. When not required the car is pushed down until flush with the floor, when the catch operates and holds it in place.

A line of hand-power dumbwaiters, which are well-known for their simplicity of mechanism, ease of installation and operation, are those turned out by the Storm Mfg. Company, Newark, N. J. One style is of such a nature that it will hold the car stationary at any point without the use of a brake or rope clamp, for the moment the operator ceases pulling the hand rope, either raising or lowering, an automatic clutch holds the car in its place. Still another style is arranged with gears for lifting heavy loads. Another form is equipped with a band brake which operates on the main hoist wheel and controls the load at any point either in hoisting or lowering. Partial application of the brake controls the speed, which is particularly desirable when the installation is in high buildings.

A sanitary automatic dumbwaiter or refrigerator and food cabinet, as it may be called, so made that it drops to the basement at a pressure of the foot, leaving the floor space intact, is that which has been put out by the York Automatic Dumb-Waiter Works, York, Pa. By a slight pressure of the foot upon a button placed in an iron cap, flush with the floor, the dumbwaiter rises automatically and when no longer needed, by slight pressure, it is moved down into the cellar. The dumbwaiter is manufactured in various styles and sizes, some with receptacles for ice, while others depend upon the temperature of the cellar to preserve the food. The style illustrated in the cut herewith is of the latter type, known as size 3. This is provided with a metal bread and cake box at the top, 9 in. high, beneath which are five shelves, four of which are 6½ in. in hight, while the lowest one is 10½ in. high. The waiter measures 16 x 20 x 4 ft. 6 in. The hardware is of ornamental antique copper finish, while the inside is finished in white enamel.

◆

New York Sheet Metal Contractors

An enjoyable reunion was held by the Employers' Association of Roofers and Sheet Metal Contractors of Greater New York in the headquarters of the Building Trades Employers' Association, 30 West Thirty-third street, New York, on April 2. After hearing the report of the officers and giving them congratulations for their excellent work during the year, the association took up the election of officers with the following results: President, James R. McAfee; first vice-president, William M. Watkins; second vice-president, Charles Hartmann; secretary, Herman Weinberger, 608 Greene avenue, Brooklyn, N. Y.; treasurer, John W. Askerman.

New Publications

New Building Estimator.—By William Arthur. 744 pages. Size, 4¾ x 7 in. Bound in flexible covers with gilt side and back titles. Published by the David Williams Company, 231 to 241 West 39th Street, New York City. Price, $3.

The broad and rapidly increasing popularity of this well-known work among architects, contractors and builders, as evidenced by the constantly augmented sales, has rendered a new edition necessary. It is the same as the eleventh issued a few months ago except certain minor changes have been made and some slight typographical errors have been eliminated. In its present form it serves the needs of all connected with building construction in even a more satisfactory manner than before. It is comprised in two parts, the first of which deals with approximate estimating and the second with detailed estimating. It is a work which as the building season gets under way should be in the hands of every practical builder, for it is a well-known fact that his success in business depends in large measure upon his ability to make correct estimates of the cost of the buildings for which he secures the contracts. More than 8000 copies of the work have been sold since the 1913 edition was issued and these have gone to contractors, builders, architects, engineers, appraisers and insurance adusters in all sections of the country, thus showing the broad field to which the work is well adapted.

How to Frame a House.—By Owen B. Maginnis; 160 pages; size 7½ x 9½; illustrated with numerous line cuts. Bound in cloth. Published by the William T. Comstock Co. Price, $1.50.

The field of this work is announced in a subtitle as : "A Practical Treatise on the Latest and Best Methods of Laying Out, Framing and Raising Timber Houses on the Balloon Principle, together with a Complete and Easily Understood System of Roof Framing." It is the seventh edition of the work and contains several of the author's recent articles which appeared in *The Building Age* and other publications, thus bringing the matter up-to-date. An interesting section is that entitled: "Rustic Carpentry and Joinery," in which is given examples of the framing of logs as employed in the construction of log houses. A section is also devoted to rustic details such as fences, arches, etc. At the close of the work is appended a chapter on how to move a house, and another on practical information for carpenters which emphasizes the importance of accurate measurements.

◆

The first official pouring of concrete in connection with the new buildings of the Massachusetts Institute of Technology, Boston, Mass., occurred at noon on Thursday, April 9. The place selected for the pouring was in the center of the east outside wall of the Department of General Studies. Other units are well under way, so that five of them will be pouring cement by the end of April.

Sheet Metal Ceiling for Moving Picture Theater

In our April issue there appeared an article illustrating and describing a moving-picture theater located in the Borough of the Bronx, New York City, and of which Goldner & Goldberg were the architects. In the article the name of the makers of the metal ceiling used in the building was inadvertently stated, although it was printed in accordance with the information furnished by the architects. The statement in question should have read, "The metal ceiling was furnished by the Canton Steel Ceiling Company, 221 Eleventh Avenue, New York City," which it may be noted is the eastern representative of the Canton Art Metal Company, Canton, Ohio. We make this correction in order that credit may be given to those to whom it is due.

◆

Circular Court House Design Approved

The preliminary plans by Architect Guy Lowell for a New York County Court House of circular design have been approved and the Court House Board executed the formal contract with Mr. Lowell on the afternoon of April 17, making him their architect and guaranteeing him 6 per cent. on the cost of the $10,000,000 building.

◆

Illinois Building at Panama Exposition

Plans calling for an expenditure of $100,000 for construction and about $25,000 for furnishing the Illinois State Building at the Panama-Pacific Exposition have been finally approved by the Illinois State Commission. The approved plans passed on by the State Art Commission, and executed by State Architect Dibelka, call for a structure of exceptional beauty in interior and exterior treatment.

The committee also voted unanimously to offer prizes aggregating $500 for the best design for the embellishment of the front of the building. These designs are either to be historical or prophetic of the future of the state, subject to the approval of the commission. First, second and third prizes will be awarded.

◆

An organization known as the Building Material Dealers Association of Eastern Pennsylvania has just been effected at Reading, Pa. It is intended to include in the organization all prominent dealers in building supplies in Eastern Pennsylvania and to do away with the competition offered the retailers by the manufacturers in their factory-to-home plan.

◆

Mayor Mitchel of New York City has signed the Hights of Buildings bill which recently passed the legislature, and it has now gone to the Governor for his approval. Mayor Mitchell, however, is doubtful of the constitutionality of the measure.

◆

One hundred and eighty-one congresses and conventions have voted to meet in San Francisco during the year of the Panama-Pacific International Exposition.

A Brief Review of Building Situation

Figures Showing Building Activities in Leading Centers Based on Permits Issued in March, 1914, and March, 1913

As the building season opens the figures showing the amount of new work projected in various sections of the country are more than ordinarily interesting for the reason that they foretell in a measure at least what is to be expected as the months go by. While the figures available indicate more or less irregularity throughout the country—that is, showing increases in some cities and decreases in others—the reports considered as a whole are highly gratifying, and for 92 cities they indicate an increase in March of 4 1-3 per cent. as compared with March last year. Of these 53 show increases and 39 decreases.

In considering the figures we have divided the country geographically into four sections, and in the tables appended is clearly indicated the projected construction work for the two periods named. As regards the cities in the Eastern States, naturally most interest centers on New York City, where for some time past building has been at a low ebb, much of the work being the tearing down of old structures and erecting on their sites more pretentious buildings. Of the five boroughs constituting Greater New York the figures for March show a slight increase over March last year in Brooklyn and Queens, although the total for the city is appreciably less than for March a year ago, Manhattan being the principal sufferer.

There are 17 of the Eastern cities reporting which show a decrease as compared with a year ago and 12 show an increase, the result being a loss of 10½ per cent. for the Eastern section of country as compared with March, 1913.

CITIES IN EASTERN STATES

	1914		1913	
Albany	188	947,900	212	400,255
Allentown	82	158,850	31	131,800
Altoona	66	105,397	88	121,025
Bridgeport	102	685,061	101	250,653
Buffalo	309	660,000	311	1,694,743
Elizabeth	38	112,579	46	445,203
Erie	215	199,784	122	123,200
Hartford	104	481,345	110	453,505
Holyoke, Mass.	22	37,365	29	237,750
Jersey City	82	384,744	97	932,073
Lawrence, Mass.	21	72,040	24	91,550
Newark	145	321,240	274	1,173,888
New Bedford	121	463,510	140	224,750
New Haven	106	425,380	109	289,482
New York City—				
Manhattan	463	7,912,254	395	9,287,233
Bronx	283	1,831,168	321	3,290,178
Brooklyn	....	3,736,130	....	3.018,295
Queens	632	2,831,855	647	2,463,550
		16,311,407		18,059,256
Passaic, N. J.	18	64,122	30	104,725
Paterson, N. J.	54	100,347	69	137,287
Philadelphia	1,808	5,179,030	1,772	6,206,500
Pittsburgh	304	958,618	338	716,817
Portland, Me.	24	57,435	44	106,000
Reading	100	171,050	60	121,025
Rochester	274	775,030	280	731,941
Schenectady	34	155,713	67	152,769
Scranton	43	48,808	58	86,306
Springfield, Mass.	138	563,018	127	612,085
Troy	31	16,999	42	93,135
Washington	....	1,544,778	....	760,950
Wilkes-Barre	60	44,303	51	167,311
Worcester	119	351,228	142	469,812
		31,397,081		35,095,796

The next geographical division covers leading cities in the middle states, and here we have a gain of 22.6 per cent., there being 23 cities showing a gain and 7 a decrease.

CITIES IN THE MIDDLE STATES

	1914		1913	
Akron	209	288,160	148	235,060
Cedar Rapids	35	170,850	24	151,000
Chicago	1,170	8,111,550	937	7,690,600
Cincinnati	...	863,810	...	791,310
Cleveland	1,409	4,070,255	830	2,296,480
Columbus	293	655,995	222	307,328
Dayton	51	335,100	40	41,775
Davenport	54	132,500	21	50,950
Detroit	860	2,290,915	858	2,295,825
Duluth	107	263,541	81	1,797,205
East St. Louis	67	86,283	50	58,682
Evansville	120	107,615	81	102,463
Grand Rapids	517	1,239,253	119	184,750
Indianapolis	562	782,384	454	754,305
Kansas City	423	1,516,380	341	911,260
Lincoln	....	72,500	....	85,675
Milwaukee	369	694,924	281	649,39[illegible]
Minneapolis	542	2,093,915	347	755,885
Omaha	147	321,165	108	265,575
Peoria	72	500,285	24	106,000
Saginaw	54	35,095	35	49,460
St. Joseph	70	44,736	82	78,370
St. Louis	910	1,450,034	721	1,452,939
St. Paul	252	2,343,702	208	1,063,286
Sioux City, Ia.	....	286,535	....	155,535
South Bend	45	67,055	19	33,802
Springfield, Ill.	21	79,140	30	40,705
Toledo	323	556,928	173	282,255
Topeka	44	37,320	56	128,125
Youngstown	70	164,240	81	148,295
		29,662,165		22,964,294

A rather peculiar condition exists in the Southern states, where, of 17 cities reporting, 10 show an increase in March as compared with the same month last year, yet the summary indicates a loss of 8¼ per cent. for that section of the country. This result is brought about in a measure by the figures for Birmingham, showing 323 buildings to have been planned, costing only $236,595, while in March last year 311 were planned, involving an outlay of practically $950,000. Dallas, Texas, also shows a heavy reduction over last year, as do also Memphis, New Orleans and Richmond, Va.

CITIES IN THE SOUTHERN STATES

	1914		1913	
Atlanta	341	561,644	316	435,340
Baltimore	...	918,362	...	814,871
Birmingham	323	236,595	311	949,725
Chattanooga	188	111,140	190	66,290
Dallas	234	807,213	215	1,054,640
Louisville	225	661,525	...	291,010
Memphis	279	370,300	345	573,321
Nashville	79	229,980	41	186,554
New Orleans	...	230,609	...	553,301
Norfolk	...	334,928	...	429,928
Richmond	170	539,848	222	615,236
Roanoke	46	83,845	...	87,345
San Antonio	220	204,540	273	193,830
Savannah	67	194,400	41	163,300
Shreveport	...	122,503	...	97,407
Tampa	132	114,855	110	97,266
Waco	...	435,620	...	103,850
		6,157,907		6,713,214

Taking leading cities of the country west of Kansas, Nebraska and the Dakotas, there is shown a gain of 8 per cent. in March over the same month a year ago. This is brought about largely by the more expensive nature of the buildings planned in San Francisco, the amount totaling for March $3,956,475, as against $1,599,967 in the same month a year ago. Seattle also shows an increase over a year ago, as do Salt Lake City, Pasadena, Stockton and Tacoma. Decreases, on the other hand, are shown by the cities of Denver, Oakland, Sacramento, San Diego and Spokane.

CITIES IN WESTERN STATES

	1914		1913	
Berkeley, Cal.	112	263,550	104	334,850
Colorado Springs	27	14,178	37	20,548
Denver	...	311,610	...	322,400
Los Angeles	1,116	2,179,756	1,671	3,034,213
Oakland	388	625,907	407	917,022
Pasadena	149	221,491	147	175,822
Portland, Ore.	708	882,965	616	886,760
Pueblo	24	33,720	34	25,625
Sacramento	164	236,174	163	569,177
Salt Lake City	113	307,150	47	124,700
San Diego	279	262,686	378	492,840
San Francisco	561	3,956,475	571	1,599,967
San Jose	45	79,315	45	63,132
Seattle	881	923,480	845	768,850
Spokane	108	86,335	121	159,920
Stockton	59	105,481	46	83,630
Tacoma	170	137,968	180	123,423
		10,628,241		9,702,879

For the first three months of the year the figures very nearly balance, March this year having the call to the extent of about 2 per cent.

33 "Burts" for Ohio Salt

Thirty-three glass-top Burts (our Combination Skylight and Ventilator) on the new plant of the Ohio Salt Company—that is how we made good. A salt factory is not the easiest place to ventilate, yet since the Burts were installed the Ohio Salt people have had perfect ventilation. Their first order was followed by others, because the Burt demonstrated its ability to make good.

The Burt can be closed in stormy weather without affecting the lighting qualities. This is due to the sliding sleeve damper—an exclusive Burt feature. Nor is it necessary to fasten the damper cord to a nail or post. A special attachment holds the damper firmly in any position it may be adjusted.

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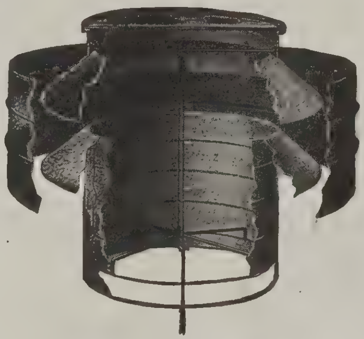

Notice Sliding Sleeve Damper (patented). Furnished with flat wired glass, up to and including the 72-inch size. Also with Metal Tops.

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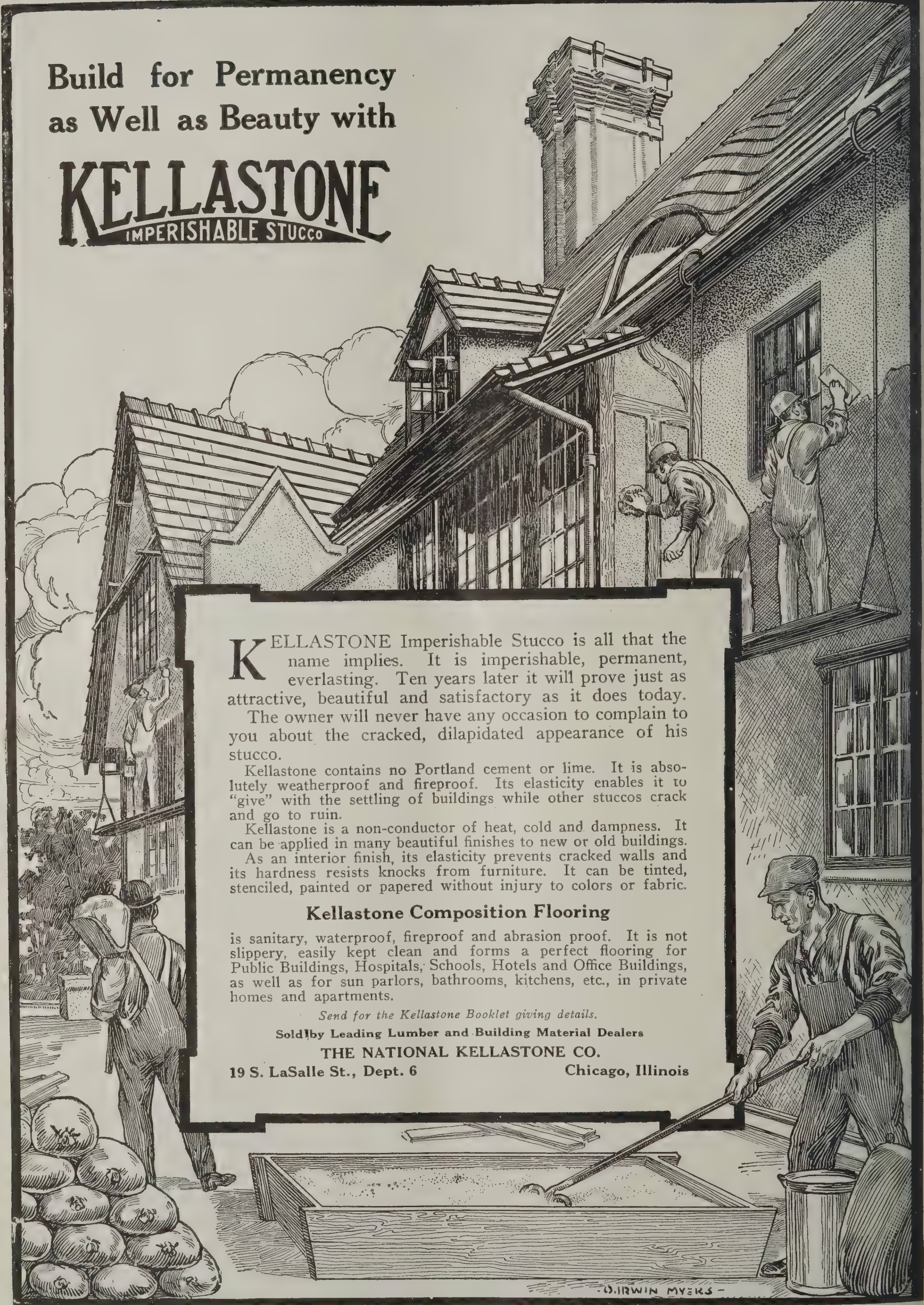

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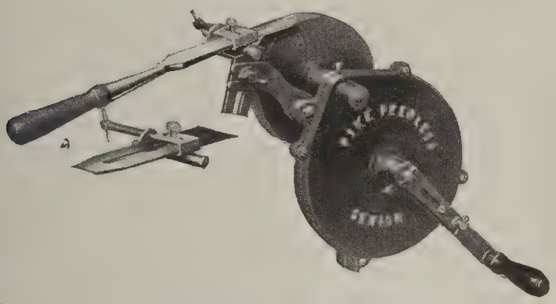
Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to
do with the Various Branches of the Building Business

The Pike Bevel Guide

The importance of sharp edges to a carpenter, or, in fact, to an employer of carpenters can not be too highly emphasized. Time lost by using dull tools is an important factor on any job, and to follow out practically the same thought, time lost in sharpening dull tools, especially on a big job, may represent the difference between profit and loss on the entire contract.



The Pike Bevel Guide—Fig. 1—Showing how the Device Is Used When Sharpening Tools

The carpenter of to-day can't afford to waste his own time or that of his employer and because a good tool grinder does in a minute as much as a grindstone does in a half hour and does it better all up-to-date carpenter shops are gradually being equipped with one or more modern tool grinders.

To enable the user of its Peerless Grinders to do perfect grinding, the Pike Manufacturing Co., Pike, N. H., has recently perfected the "Pike Bevel Guide," by which a dull tool is made as good as new by giving it a hollow ground bevel, and this is done easily and quickly without trouble and without practice. Many clever and experienced workmen have an idea that a concave or hollow bevel on chisels or plane irons is more apt to break than is a straight bevel. This is true only with tools made from inferior steel and possibly with mortising or other similar chisels. The difference between the thickness of the straight bevel and the hollow ground bevel is not enough to affect the strength of the tool edge, but it is enough to greatly affect the ease and quickness with which the tool works; and another big advantage is that the hollow ground bevel lasts longer than the straight bevel—it does not need to be ground so often and the oilstone is used less frequently with consequent saving in time.

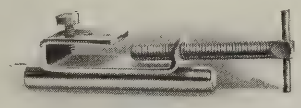


Fig. 2—The Tool Holder

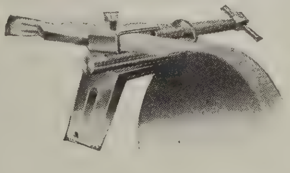


Fig. 3—A Chisel in Place for Grinding

So far as the manufacturers know the Pike Patented Bevel Guide is the only device that will completely assure the user of obtaining a perfect hollow ground bevel. In Fig. 1 of the illustrations is clearly shown the simple operation of the Pike Bevel Guide. Fig. 2 shows the tool holder with adjustable screw to take any size of chisel, plane iron, etc. Fig. 3 shows a chisel in place for grinding. The tool rest slides freely back and forth in the groove and after this is adjusted to the proper bevel angle it is impossible to make the grinder give anything but a perfect, good-as-new hollow ground bevel.

The company has prepared a booklet entitled "A Sharp Edge in a Hurry," which will be sent to any one who wishes further information about this Bevel Guide which is an exclusive feature of the Pike Peerless Grinders.

Millers Falls Tool Holder No. 600

A conveniently compact tool of practically an indestructible nature and one for which the building mechanic finds frequent opportunity to use is that which we illustrate in Fig. 4 of the engravings. It is referred to by the makers as tool holder No. 600, and contains within the hollow receptacle of the handle the ten tools which are displayed in the illustration. The holder itself consists of a handsomely knurled handle, the smooth parts being nickel plated and having a high polish. The chuck is provided with hardened steel jaws, which by revolving the ferrule about them may be made to clamp the shank of whatever tool is being used with a vise-like grip. The tools not in use are retained within the hollow handle by means of the cap, which screws securely into place. The tools themselves are made of the best steel, are carefully tempered and finished, and are sharpened to give a fine cutting edge. Each tool is 2¼ in. in length, while the handle measures 5 in. By reason of the substantial construction of the tool holder and its indestructible nature it can be used for driving tacks and small nails should occasion require it. The tool is also of special interest to the handy man about the house, as it can be utilized in connection with a vast number of little jobs which, while not calling for a complete "kit of tools," require perhaps a chisel, a gimlet, a small screw driver or a punch. The tool is packed in a neat pasteboard box and is made by the Millers Falls Company, Millers Falls, Mass., and with New York City sales office and warehouse at 28 Warren street.

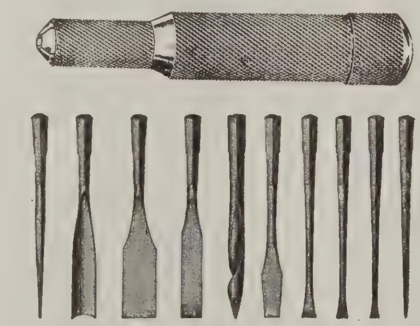


Fig. 4—The Millers Falls Tool Holder No. 600

A New Low Priced Mixing Machine

The season is now at hand when contractors are busily engaged in building operations and are naturally interested in new improvements for the economical mixing of concrete, more especially as this material is being so extensively employed in connection with construction work of all kinds. There are no doubt thousands of contractors all over the country who mix concrete by hand because they cannot afford to buy an expensive mixer for the small amount of work which they are called upon to do. In order to meet the requirements of the case the Standard Scale & Supply Company, 1345-47 Wabash avenue, Chicago, Ill., now offers to the building contractor the "SSS" low-charging mixer mounted on four wheels, equipped with two-horsepower "SSS" vertical hopper cooled gasoline engine—an outfit which is illustrated in Fig. 5 of the engravings. The engine is of simple compact design and low in operating cost. It has belt drive to countershaft with chain around the drum, the belt drive being equipped with idler so that the drum may be stopped without stopping the engine. The mixer here shown is particularly adapted to any class of work such as small foundations, floors, silos, sidewalks, repairing streets, curb, gutter, etc. As a general thing the small contractor does not have enough concrete work to do to pay for a mixer and the main advantage of the one here shown is that with it he can first mix the concrete for the foundation walls of a building, then he can mix the mortar for the bricklayers and finally the plaster for the interior work. These features are of considerable interest to the progressive building contractor, as experience has proven that more and better work with less labor and less time can be accomplished by the use of the mixer here shown. The claim is made that it will pay for itself in a saving of labor as compared with hand mixing in the space of a few weeks. It is possible to mix and place in an eight-hour day with four men from 20 to 30 cubic yards of concrete, while it is pointed out that the best that these four men could do under ordinary working conditions by hand mixing would be about 12 cubic yards. This, of course, means a large increase in output and decrease in mixing cost, to say nothing about the higher grade of uniform mix. In other words, the contractor can do as much in one day as it previously required two and one-half days.

A New Low Priced Mixing Machine—Fig. 5—General View of the Mixer

The complete outfit is of such a nature that it can be taken through any ordinary door and placed inside, also can be taken up on an ordinary elevator, as the tread of wheels is only 3 ft. The "SSS" mixer is of the batch type and is built light, weighing only 1200 lb. complete on trucks. It can be moved anywhere on the job by one man. The company has issued a circular known as No. 485, which describes the "SSS" mixer, and a copy of it will be sent to any building contractor who may write for it.

Cement Workers' Tools

An attractive catalogue of 26 pages sent out by E. C. Stearns & Co., 400 Oneida street, Syracuse, N. Y., illustrates leading lines of cement workers' tools which it is prepared to supply. The tools numbered from 100 to 200 are made of close-grained cast iron, finely polished and nickel plated, while those numbered from 200 to 300 are made from special hard bronze, highly polished. All handles are wax finished in the natural wood. In connection with the numerous illustrations tables of figures are given showing the numbers, sizes, dimensions, prices and material of which constructed. In the center of the catalogue is a two-page half tone engraving of a magnificent residence, the steps and walks leading to which are of cement. The tools required for doing the various kinds of cement work in connection therewith are shown in position for executing it.

New Vice-President of Yale & Towne Mfg. Company

At a meeting of the board of directors of Yale & Towne Mfg. Company held on March 12, and immediately following the annual meeting of the company, Walter C. Allen was unanimously elected a vice-president. All the other officers were re-elected for the ensuing year.

For the past five years Mr. Allen has held a position of general manager, having charge of the sales policy and management in all departments of the business at home and abroad excepting the Bank Lock Department. He entered the company's service in 1891, and within a year was promoted to a clerical position which he soon resigned in order to enter himself as an apprentice in the tool and machine shop, where he served for three years. During the next three years he worked as a draftsman in the company's drawing office, and in 1900 was placed in charge of certain important work in the Bureau of Costs. In 1905 he was appointed assistant general superintendent under the late Fred T. Towne, and on the death of the latter in 1906 was appointed his successor. In this position he had the direct and responsible management under the president of the entire Stamford plant. In 1909 he was transferred to the general offices of the company in New York City, and as general manager was placed in charge of the Commercial and Sales Division of the company's business.

Casey Universal Saw

A saw which it is claimed will cross cut at two angles in one operation, will rip at any angle from a square to a nonagan, and which is of such a nature that it is not necessary to stop it in order to set it for the angle desired, is illustrated in Fig. 6 of the engravings. It is known as the Casey universal saw, and is constructed of semi-steel castings with phosphor bronze bearings. It can be furnished mounted on rigid frames with boring attachment, jig saw and joiner, or it can be mounted on wheels, thus making it portable so that it can be moved from place to place. The saw is adapted for cutting out forms for concrete work, and among other things is useful in cutting the angular inner end of rafters used in constructing gable or hip roofs—the inner ends of these rafters being cut at an angle across the width and at an angle across the thickness of the rafter. The saw mandrel and stock-supporting table can be shifted for adjustment of parts

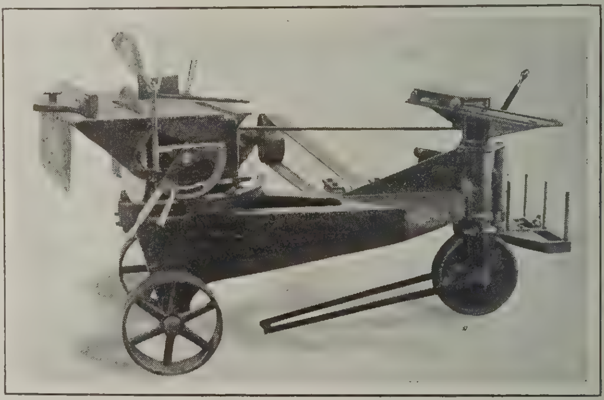
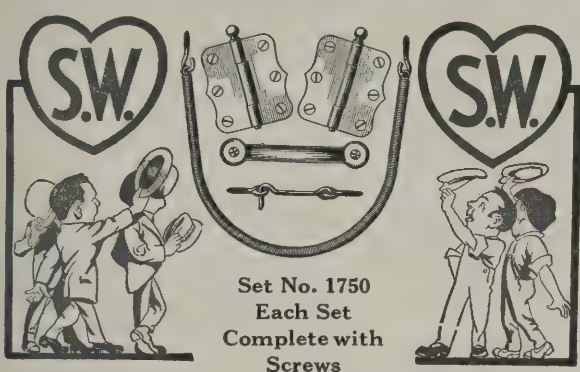


Fig. 6—The Casey Universal Saw

(*Continued on page 74*)

STANLEY'S
Wrought Steel Screen Door Hardware



Set No. 1750
Each Set
Complete with
Screws

Ready to Go On the Screen Door

Owners and Builders alike are pleased with the high quality of the hardware and the convenient way it is packed ready for use.

Don't Swat the Fly—Keep Him Out

A screen door hung on a pair of Stanley Butts and held shut by a Stanley Spring will do better work than a dozen fly swatters. **The door is quickly and easily removed in fall by merely slipping out the pins, and it is as readily rehung in the spring.** Write for circular "E." It tells the story.

THE STANLEY WORKS
New York New Britain, Conn. Chicago

Black Diamond
File Works

ESTABLISHED 1863 INCORPORATED 1895

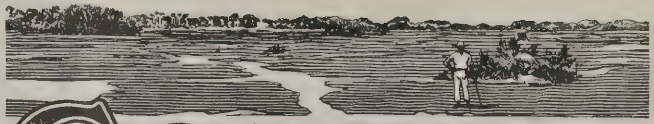
TRADE MARK

TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company



Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

Natural asphalt is the life of roofing. And roofing with life defends itself against all weathers.

The oils of natural asphalt keep it pliable and waterproof. In Genasco they do not dry out and leave the roofing to crack, rot, or crumble. They give it lasting resistance.

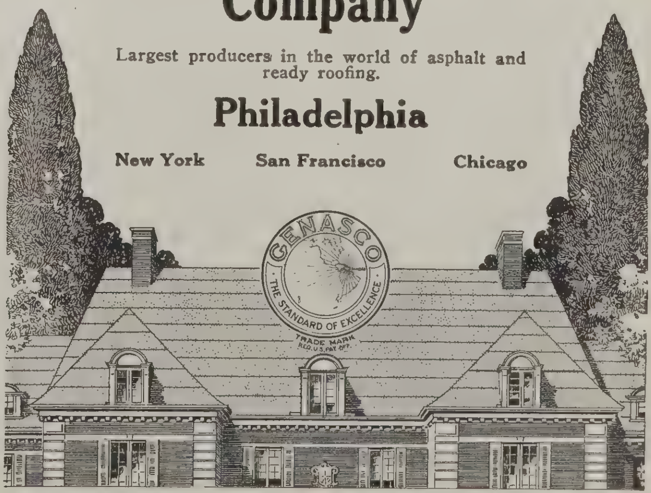
Trinidad Lake asphalt has withstood the blazing sun and torrential storms of that tropical climate for centuries. It makes Genasco the ideal weather-resister for all your buildings.

Write us for samples and the Good Roof Guide Book before you spend good money for inferior roofing.

Get Genasco of your dealer—smooth or mineral surface; several weights. Look for the hemisphere trademark.

THE KANT-LEAK KLEET makes seams watertight without cement, and prevents nail-leaks.

The Barber Asphalt Paving Company



Largest producers in the world of asphalt and ready roofing.
Philadelphia
New York San Francisco Chicago

In specifying varnish take this tip from the paint man

There's one varnish that beats them all, because it works easily, has a good body, covers well, dries in a hard, firm coat, gives a brilliant surface of deep lustre, is unaffected by moisture and water, does not wear or scratch white and is long wearing. You get it when you specify

Lowe Brothers "Little Blue Flag" VARNISHES

The offices of the Lowe Brothers Company were not refinished, but merely cleaned, after they were submerged with slime and water during the Dayton flood. The old varnish still looks fine.

Valuable Free Booklet

Write for "Varnish and Varnishing." It's full of valuable varnish information.

Look for this "Little Blue Flag" — your guarantee of quality

The Lowe Brothers Co.
518 E. Third St., Dayton, Ohio
Boston Jersey City Chicago
Kansas City Minneapolis
Lowe Brothers, Ltd.
Toronto, Can.

Of What Value Is a Guarantee Without a Guarantee?

Almost everybody guarantees their goods today. It is hard to make a sale unless you stand back of the goods.

But a guarantee is only as strong as the firm behind it. Its value is measured by the ability of the firm to make it good.

There is a wrong impression prevailing among most people as to the status of the guarantee. They look at it only as the promise of the manufacturer to replace defective articles. Under such a guarantee you can replace a poor tool innumerable times. You could keep it up for a lifetime (if the business lasted that long), but only at a constant loss to you through the trouble and delay occasioned by the replacement.

You should select a brand of goods where the guarantee is guaranteed.

Disston Brand Goods

have a strong guarantee of quality, but back of this guarantee is the long history of the House of Disston. The unequalled reputation which we have established for our products is itself in turn a guarantee—a guarantee that backs our guarantee.

Our reputation for making efficient and high grade saws, tools and files assures the buyer that there is little likelihood of his having to take advantage of our guarantee. That gives the guarantee its fullest meaning. It is the guarantee of a guarantee.

HENRY DISSTON & SONS
Incorporated
Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, U. S. A.

simultaneously. In fact, the arrangement is such that an almost unlimited number of operations may be performed on the machine. It is made by the Casey Universal Saw Company, with offices in the Merchants' Building, Sixth and College streets, Cincinnati, Ohio. It is regarded as a labor-saving and money-making device to those who have practically demonstrated its merits.

Varnish and Varnishing

Some very valuable and instructive information bearing on the above subject is contained in a little work which is being sent out by the Lowe Brothers Company, Dayton, Ohio. In the first place it tells what varnish and varnishing are, then deals with the surface to which the varnish is to be applied. The foundation coat is then considered, after which the virtues of a floor varnish are considered, the different purposes for which varnish is demanded are suggested and there is a chapter telling why good varnishes sometimes fail. Another chapter deals with the part which the finisher plays in obtaining good results; then things to remember about varnish are given together with various comments on stains and enamels.

Prize for a Name for Edwards New Metal Shingle

The Edwards Mfg. Company, 423 to 443 Eggleston avenue, Cincinnati, Ohio, makes the announcement that $5 will be given to any one who will furnish the right name for the new metal shingle which it is placing upon the market. The company has brought out so many new shingles that it has run out of names for its "infants," as it terms them, the shingle shown in Fig. 7 of the engravings being the latest "baby" in the large family of Edwards metal shingles and it is still to be named. All of Edwards' many shingles are made of the highest quality terne plate, all are painted with special mineral paint or are galvanized by Edwards special "Tightcote" process. The shingles are claimed to be fireproof, wind-proof, rain and snow-proof. Provision is made for expansion and contraction through the medium of the patent interlocking device. The point is made that the shingles are attractive in appearance and nothing has been overlooked to make them satisfactory in every way.

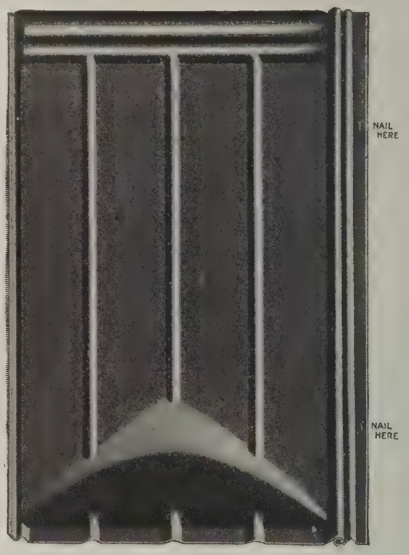


Fig. 7—Edwards New Metal Shingle

Sectional Catalogue of Woodworking Machinery

Something of a variation in the way of literature relating to woodworking machinery is the sectional catalogue which has just been issued from the press by the J. A. Fay & Egan Company, of 221 to 241 West Front street, Cincinnati, Ohio. This is the third edition of Section 1, the complete sectional catalogue at present consisting of 24 sections dividing the companies tools and appliances into groups, each group containing only machines of similar design and pur-

(*Continued on page* 76)

From Warehouse to Car to You

Building Material at Half Price

GORDON-VAN TINE CO. will supply you quality building material at about half dealer's prices. Because they sell direct to you instead of the goods going through several hands.

Right now you can order your choice of 5,000 bargains shown in the Grand Free Catalog, and your order will usually start by fast freight with 24 hours. That service counts when you are in a rush to keep workmen busy.

And you are guaranteed safe delivery and satisfaction.

Just figure that over; **a hundred thousand** delighted customers, some in every state and county, testify to money saved and satisfaction given by Gordon-Van Tine. This has been going on for years. All selling is done by mail, 2c stamps take the place of high-priced men. Figure it over and then write for the wonderful catalog of 5,000 bargains in building material, hardware, paints, roofings, lumber.

Gordon-Van Tine Catalog is Free to Building Age Readers

PRICES:

Catalog Shows 5000 Bargains

Good Strong Door	$ .77
Glazed Window	.66
Porch Column	.55
Porch Balusters	.04
Porch Rail, per ft.	.03½
Hot Bed Sash	1.75
Storg Window Screen	.53
Barn Paint, per gal.	.75
House Paint, per gal.	1.17
Floor Paint, per gal.	1.09
Floor Varnish, per gal.	1.50

Pine Mouldings

¼-Round,	pr. 100 ft.	$ .30
Door Stops,	"	.33
Window Casing	"	1.80
Oak Flooring	"	.80
Blinds,	pr. pair	1.35
Hinges, 3½x3½, Best	"	.14
Good Lock Set		.23
Elect. Bell Sets, complete		.95
Hay Carrier, Best		3.65

GORDON-VAN TINE CO.

699 FEDERAL ST. DAVENPORT, IOWA

WEATHER VANES

ALL SIZES AND DESIGNS

SEND FOR CATALOGUE

E. G. Washburne & Co.

208 Fulton Street
New York

Something For You

in our Pamphlet 29; viz:
Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.
Some of these Tables are not in print elsewhere.
The Pamphlet and a Mounted Model Hanger will be mailed on request.
SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

Van Dorn Joist Hangers

and Post Caps are strongest and easiest to apply. To apply Hangers: Simply square ends of joist so they fit snugly against header. This gives hanger additional purchase.

Used in mill constructed buildings, also in framing around stairways, headers, around chimneys and all joist connections.

Send for Catalog and Prices.

Van Dorn Iron Wks. Co., Cleveland, O.

BUILDING, ROOFING
and
INSULATING PAPER
WOOD-WORKING GLUES

SAMPLES AND PRICES SENT ON REQUEST

C. B. HEWITT & BROS.
48 Beekman St., New York City

pose. Each catalogue is compiled separately and only those sections are included that the company feels are applicable to the business of the concern which is to receive it. In the catalogue before us illustrations are given of a great variety of general woodworking machinery adapted to meet many requirements, the patterns embracing scroll saws, band saws, band saw filing and setting machines, resawing attachments, tilting tables, saw benches, iron frame rip saws, variety saws, universal ripping and cut-off saws, swing cut-off saws, spindle and disk sanders, sash and door stickers, sash clamps, knife grinders, circular cylinders, cutter heads, etc.

The Check to Dampness

We have just received from Toch Bros., 320 Fifth avenue, New York City, an attractive edition of their "Red Book" entitled "The Check to Dampness." It contains valuable data for the architect, the builder, the contractor and the engineer who desires to keep posted on the latest developments in materials for the preservation and decoration of every type of building construction. The little book is replete with data pertaining to the materials which are proof against all destructive agencies, and in addition contains authoritative data on the integral waterproofing of swimming pools, reservoirs, etc., also the treatment of cement floors in loft buildings, warehouses, automobile plants, public and private buildings, etc. Different surfaces, different climates and different conditions of application require different "R. I. W." paints and compositions, as no one paint or composition is equal to all conditions. "R. I. W." paints of special composition and manufacture are used for plastering upon; for stain and damp-proofing limestone, granite, marble, etc.; for preserving steel of different types subject to various corrosive agencies and for resisting the fumes of acids and alkalies in factories, laboratories, etc.

Catalogue of Sanitary Pottery

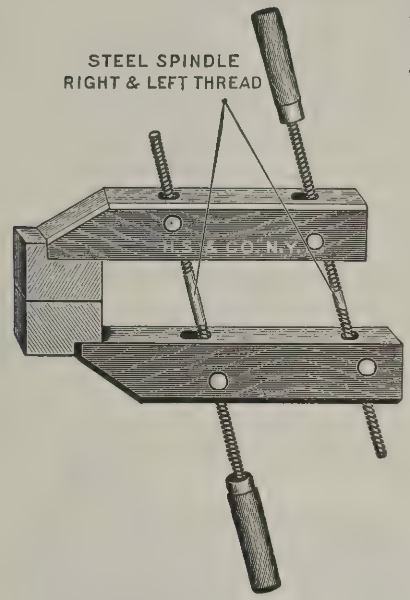
A very attractive and well-arranged catalogue of 360 pages issued by the Trenton Potteries Company, Trenton, N. J., shows an extensive line of sanitary pottery embracing bath room, toilet, kitchen and laundry fixtures which cannot fail to interest the architect, the builder and the houseowner. The catalogue is divided into sections, one part being devoted to "Ideal" porcelain bath tubs, foot and sitz baths; another is given up to "Ideal" porcelain lavatories and drinking fountains; another to "Ideal" porcelain urinal stalls; still another to "Impervio" vitreous china lavatories of such varied and complete designs as to furnish the builder a fixture suitable for every requirement and finally an elaborate section on "Vitreous" china drinking fountains, water closets and closet tanks. The illustrations are half tone engravings of the actual goods and the entire make-up of the work is such as to render the catalogue a desirable addition to the architects' and builders' collection of trade literature.

The Legend of Medusa

In the first issue of the "Medusa Review," which is the house organ of the Sandusky Portland Cement Company, Sandusky, Ohio, there is presented the following legend of "Medusa," which we give for the interest it may have to the architect, the builder and the contractor, some of whom may not know the literal significance of the word:

"Athene, enraged at the beautiful Medusa, changed her into a Gorgon, a monstrous woman-creature with snaky locks, a look into whose face turned the beholder into stone. Perseus, son of Jove and Danae, by command of the wicked King Polydectes, and provided by Hermes and Athene with winged slippers and a helmet of invisibility, cut off the head of the Gorgon, avoiding her fatal eyes by looking only at her reflection in his shield. On his homeward way he rescued from a sea monster the beautiful maiden Andromeda, turned the giant Atlas into a mountain, and at last punished Polydectes and his counsellors by showing them the head of Medusa, which changed them to stone images."

(*Continued on page 78*)



HERE IT IS!

AN ADJUSTABLE (Jorgensen Patent) HAND SCREW

LOOK AT THE PICTURE!

The steel spindles work in steel sockets that permit of swivel movement while the jaws are *absolutely* rigid when tightened.

There are almost hundreds of positions possible, making the Jorgensen Screw superior to the old style by this immense advantage.

Send for Special Circular No. 3154 and be convinced

HAMMACHER, SCHLEMMER & CO.
HARDWARE, TOOLS AND SUPPLIES
New York, Since 1848 **4th Ave. and 13th St.**

SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.

No. 53.

A light floor or veneer Scraper with wood face to lessen friction.

A useful and convenient tool, low in price.

For full description of this and other
SARGENT WARRANTED PLANES
SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

The WINDOW CHUTE

For
Your
Coal
Bin

Ready for the Coal Man.

The Window Chute is a selling feature for any Residence or Building.

Thousands in Use—
The Very Best

If You Build
Buy
Own

Be up to date
and have the
world's best.

*Write for
Booklet C*

A Light Basement.

HOLLAND FURNACE CO.
Holland, Mich.
World's Largest Direct Installers of Furnaces

"Illinois"
Self-Watering Flower Boxes
Pat. Jan. 29, 1907; June 22, 1900.

Make Success with Plants a Certainty.
Descriptive Circulars Sent on Request.

MILLER & DOING
39-43 York St. 83-87 Washington St.
BROOKLYN, N. Y.

*Manufacturers of Architectural Sheet Metal Ornaments and Statuary of Bronze, Copper, Brass or Zinc.
Catalogue on Request.*

Prudential Steel Buildings

Steel garages have many advantages to recommend them, not the least of which is the fact that they can be transported from place to place as requirements demand, and when these structures are made in unit sections as in the case of the Prudential portable steel permanent buildings, manufactured by the C. D. Pruden Co., Baltimore, Md., this feature is paramount. Some of the designs shown in the booklet issued by the company provide for so attractive and spacious a building as to render the latter habitable as a bungalow for summer use. For hot or cold climates, the walls and ceilings are lined with asbestos board or with various other kinds of composition lining boards to prevent the heat or cold from affecting the temperature of the building. Embossed steel ceilings and side walls are also used for the same purpose.

New "Red Jacket" Door Hanger

The Richards-Wilcox Manufacturing Company, of Aurora, Ill., has added to its line the new "Red Jacket" trolley barn door hanger, for doors weighing up to 30 pounds. This door hanger has vertical and lateral adjustment and pendant bolt attached to hinged clevis that permits the door to swing out at the bottom if desired. It is adjustable three-fourths of an inch and suitable for doors 1¾ to 2 inches thick.

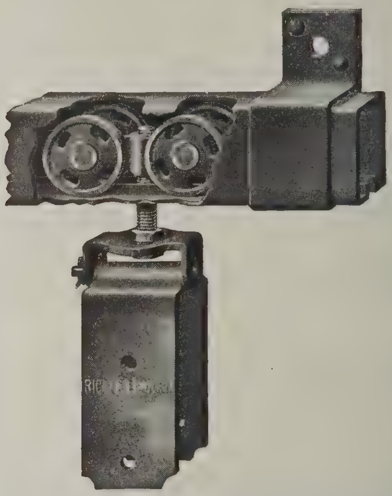


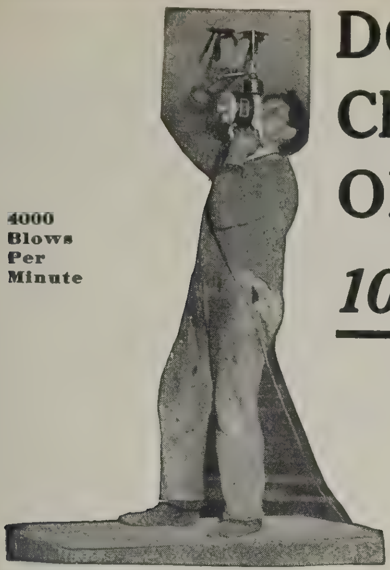
Fig. 8—The new "Red Jacket" Barn Door Hanger

The track can be attached to side or ceiling supports and is furnished in any length up to 10 feet in one piece. A pair of hangers consists of two hangers, one center, and two end brackets for side attachment, lag bolts for brackets, and bolts for hangers. The hangers weigh eight pounds per pair, the track one and two-thirds pounds per foot, and the distance from the top of the door to the center of the hole in the bracket is 5¾ inches.

Sash, Doors and Interior Finish

A very attractive catalogue of 324 pages issued by Williams & Hunting Company, Cedar Rapids, Iowa, carries illustrations of a very extensive line of sash doors and interior finish. In fact the company manufactures and deals in practically everything in the sash and door line and the goods illustrated and described are calculated to meet all reasonable requirements. There are a number of pages devoted to birch and oak front and panel doors which may be used with different kinds of trim and which are adapted for use with yellow pine, cypress and spruce; store doors, modern store fronts, base blocks, window caps, colonnade openings, paneled wainscoting, plate rails, newel posts, stair rails, designs of stairways, porch pedestals and columns of all sorts, gable ornaments, cresting, brackets, porch designs, fancy window frames, church seats, pulpits, altar railing, grilles, wood carvings, art glass of all sorts, cabinet mantels and profiles of moldings. Among the closing pages is a glossary of trade terms of interest in this general connection.

(*Continued on page* 80)



4000 Blows Per Minute

DO YOUR DRILLING, CHIPPING, CAULKING OR SURFACING

10 Times As Fast

By Using
Either
An

Electric Hammer

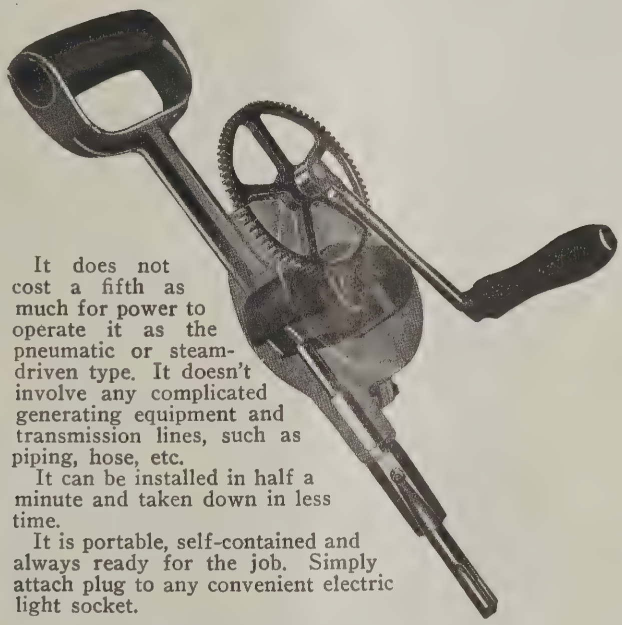
Or the Manually Operated

Drilhammer

If you have a lot of work to do, the solution of the problem for you is our ELECTRIC HAMMER.

If you have but a small amount of work to do at any one time, the DRILHAMMER is the thing to use.

Our ELECTRIC HAMMER is ten times as rapid as the crude, old-fashioned hit-and-miss method of striking the head of a drill or chisel with an ordinary hammer.



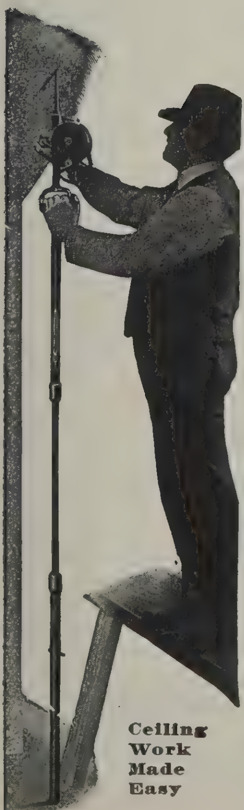
It does not cost a fifth as much for power to operate it as the pneumatic or steam-driven type. It doesn't involve any complicated generating equipment and transmission lines, such as piping, hose, etc.

It can be installed in half a minute and taken down in less time.

It is portable, self-contained and always ready for the job. Simply attach plug to any convenient electric light socket.

This ELECTRIC HAMMER is practically automatic — same pressure which holds tool against work closes switch in handle and starts operation. Delivers four thousand blows a minute. Built for various voltages. Requires only one to two amperes on 110-volt circuit. Bulletin "A. H." describes it.

For use on direct current or can be used on alternating current by using a motor generator set.



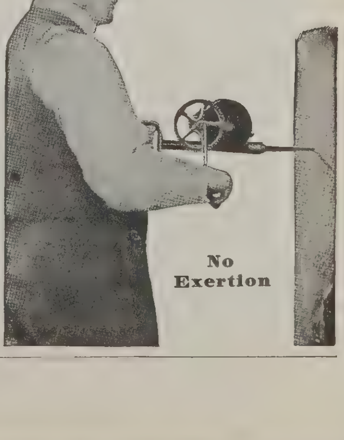
Ceiling Work Made Easy

The Drilhammer

Does the work in one minute that takes ten times as long by cruder methods. Strikes 1,000 powerful hammer blows per minute. Operator simply turns the crank. Centrifugal force does the work. Hardened tool steel hammer elements revolving at high speed strike the blows.

Exceedingly simple in construction. Has no springs to weaken or wear out. Will tremendously cut down the cost of drilling concrete, brick, stone tile, conduit, walls, floors, ceilings, etc.

Made in two sizes and accommodates drills from ¼ to 1¼". Can be carried in regular tool kit. Sold at a price which will enable every electrical worker and mechanic to have one in his kit. Write for Bulletin "Y" and prices.

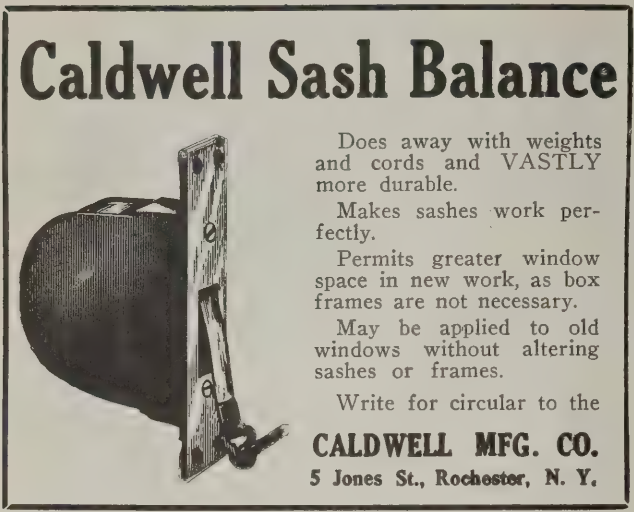


No Exertion

ORR & LOCKETT HARDWARE CO
Established 1872

Main Office, 14-16 W. Randolph St., Chicago

Branch Offices { 401 Broome St., New York
Room 608-79 Milk St., Boston


Caldwell Sash Balance

Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

CALDWELL MFG. CO.
5 Jones St., Rochester, N. Y.

Phenix Storm Sash Hangers and Fasteners

SIMPLE — easily applied —rust - proof — non - rattle — and practically unbreakable. Positively the best storm sash and screen hangers and fasteners you can buy. If not at your dealer's, send for samples—today. Hangers only, 10 cents retail; hangers and fasteners, 25 cents. Catalog sent on request.

PHENIX MFG. CO., 054 Center St., Milwaukee, Wis.

THE MYERS GIANT DOOR HANGER
PATENTED

This is one of twelve different styles of door hangers for flat or tubular track with lateral and perpendicular adjustments. Write for Our Complete Door Hanger Catalog.

F. E. MYERS & BRO.
ASHLAND, OHIO
The Ashland Pump and Hay Tool Works
THE MYERS GIANT TUBULAR DOOR HANGER
FLEXIBLE ENGINE TRUCK
MYERS
GIANT
DOOR HANGER
ADJUSTMENT TO RAISE AND LOWER THE DOOR

Boost Your Screen Sales
by recommending and selling
GOSSETT HINGES

They make it easy to attach or remove full-length window screens. Screens swing out to wash windows. Always perfectly secure.

Try a pair—after that you'll recommend them. May we send you a sample free?

F. D. KEES MFG. CO. BEATRICE, NEB Box 812

The Boss Floor Scraper

The feature of the Boss Floor Scraper which makes of it what is practically a plane, is the gauge on the front wheels at the rear of the knife in the middle of the machine. This is so arranged that it cannot follow the grain of the wood no matter what kind of lumber may be used in the floor that is being surfaced. The knife table is connected with a ⅞-in. steel shaft which goes through the main frame so that the knife can adjust itself to the floor, the swing of the knife table being adjustable by means of two screws. The springs under the gauge will raise it and the thumb screws over the head of the gauge regulate the knife to any thickness of shaving. The knife can be set to any shearing cut that may be desired. The machine is made by G. J. Kepplinger, Dwight, Ill.

Catalogue of Mill Work

We have received from the Pennsylvania Door & Sash Company, 908 Second avenue, Pittsburgh, Pa., and with Philadelphia headquarters at Twenty-fifth and Callowhill streets, a copy of a very attractive catalogue of 212 pages relating to a varied line of mill work turned out by this concern. The goods include sash and doors in great variety, inside and outside blinds, stair newels, balusters and rails, beam finish, plate rails and interior hardwood columns and colonnades, window frames for brick buildings, store fronts, staved Colonial columns with composition caps, gable ornaments, mantels, kitchen cabinets, china closets, moth-proof chests, suspended porch settees, step ladders and a varied line of leaded and art glass. The work concludes with designs of parquetry floors, embossed moldings, etc.

Rapid Floor Surfacing Machines

M. L. Schlueter, the well-known maker of floor-surfacing machines who has been located for sometime past at 103 to 105 North Canal Street, will about May 1 occupy new quarters at 225 to 227 West Illinois Street, Chicago, Ill. This change has been made necessary owing to the rapid increase of business and the necessity of more room for added equipment. Hereafter the business will be conducted under the name of the Rapid Floor Surfacing Machinery Company with M. L. Schlueter as proprietor. The statement is made that for the past two years the demand for floor surfacing machines has been such that the maker has been unable to fill all orders as promptly as he would have liked and hence the change in the business arrangements. Mr. Schlueter states that the concern will manufacture a variety of floor surfacers intended for use in connection with wood, stone, cement, marble, tile and mosaic as well as all kinds of composition floors. In fact he expects to be able to meet a customer's requirements for a floor surfacer no matter what may be the kind of floor he desires to finish or surface. The claim is made that over 5000 of the "Rapid" floor surfacers are at present in use among large and small contractors and builders, floor specialists, hotels, roller skating rinks, hospitals, government buildings, etc. It is the expectation to equip the "Rapid" stone floor surfacer with a gasoline engine for contractor's use where no electric current is readily available or where an engine is preferred.

Black Brothers Catalogue of Woodworking Machinery

Black Brothers Machinery Company, Mendota, Ill., is distributing an interesting catalogue relating to the woodworking machinery and tools which it manufactures. One of the leading products of the concern is a veneer taping machine which is of such a nature that it will use the ordinary gummed tape or it will use plain paper tape and put on its own gum or glue just before it is laid. Either steam or electric heat can be used for keeping the glue in proper condition. Numerous power veneer presses for light or heavy work are illustrated and described, also chain clamps of various kinds, a mortising machine, a column clamp for

(*Contiued on page 82*)

On all woodwork where a filled grain effect is desired use Johnson's Paste Wood Filler

Floors finished with Johnson's Paste Wood Filler are sure to give satisfaction

1 lb. of Johnson's Paste Wood Filler FREE

Johnson's Paste Wood Filler is unquestionably the best on the market. All classes of trade, including furniture manufacturers, prefer it.

It will not harden in the cans, and may be wiped with equal ease in ten minutes or two hours after being applied. It does not settle after thinning.

Johnson's Paste Wood Filler is made in several shades—*Natural, Dark Oak, Golden Oak, Antwerp*, etc. The Natural is slightly tinted with Ochre so it will not show white in the grain of oak, maple and other woods. Mail the coupon and secure free and postpaid a pound of Johnson's Paste Wood Filler for trial. We will also send you a free copy of our 25c book "The Proper Treatment for Floors, Woodwork and Furniture," which gives detailed information on finishing wood—soft or hard—old or new.

Johnson's Prepared Wax

is a complete finish and polish for all wood—floors, woodwork and furniture. Apply with a cloth and in five or ten minutes polish with a dry cloth. Gives perfect results over any finish—varnish, shellac or oil. For polishing **automobile bodies** and bar tops it has no equall

Johnson's Flat Wood Finish enables you to get hand rubbed effects with little labor and extra profit

Johnson's Flat Wood Finish

gives that artistic, hand-rubbed effect at one-third the expense. Does not require rubbing or polishing. Remember—for any work on any wood Johnson's Finishes are best.

Johnson's Prepared Wax is a lasting artistic finish for floors-new or old-soft or hard

Please send me free and postpaid a pound sample of Johnson's Paste Wood Filler. I agree to try it and report results to you.

I buy paints from....................

Name.....................

Address....................

City....................

State....................

To
S.C.Johnson & Son
"The Wood Finishing Authorities"
Racine, Wis.
C B-5

TAINTOR'S POSITIVE No.
TAINTOR MFG. CO. NEW YORK U.S.A.
Self-adjusting, except turning anvil to change setting

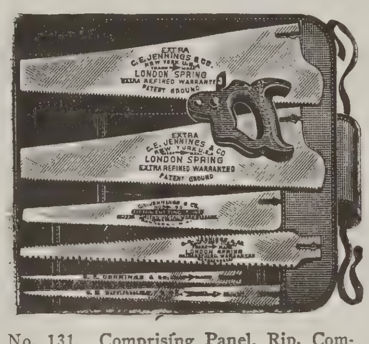
DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch. Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., New York



C. E. Jennings Arrow Head Combination Sets of SAWS
Adjustable Handle

The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set in a Box or Leather Case if So ordered Extra.

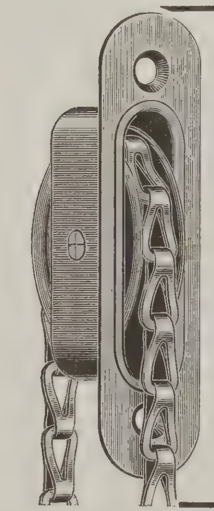
We will send a set by parcel post if your dealer cannot supply you.

No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

Send for circular.

Sole Manf's

C. E. JENNINGS & CO., 71-73 Murray St., New York



NIAGARA SASH PULLEY
PREMAX SASH CHAIN

This is a bushed pulley, solid, safe, easy to put in place, handsome in appearance and will last as long as the building in which it is used. Takes a cord perfectly, and will not cut or wear it. It is equally well adapted for carrying a chain.

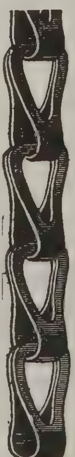
The Premax Steel Sash Chain is made of the best open hearth steel, is handsome, strong and in every way reliable. It runs on our pulley, or on any other standard pulley, with the greatest ease and smoothness. Made in either bright steel or genuine electroplate of copper, nickel, brass or zinc.

Also SYMPLIST SASH FIXTURES. For use with Sash Chain.

Samples and Folder 57-A on Request.

NIAGARA FALLS METAL STAMPING WORKS
Manufacturers of Hardware Specialties
Niagara Falls, N. Y., U. S. A.

S-64



COPPER CABLE SASH CHAIN

CHAMPION METAL SASH CHAIN

Thomas Morton
245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS

CHAINS
For Suspending Heavy Doors, Gates, Etc.

All of SUPERIOR QUALITY

clamping staved columns, hand screws, cabinet clamps, etc.

Two Catalogues of Interest to Builders

The development of the railroad and mail service has resulted in so many benefits to the public in general that we often lose sight of them. The transportation of passengers and mail has not only brought us closer to our fellows and increased our knowledge of the country and conditions in which we live, but has made long-distance "shopping" so common that many persons who are more or less isolated from the large shopping centers have practically the same advantage as those nearby.

This is well illustrated by the two catalogs, "Building Material Catalog" and "Plans of Modern Homes," which have been issued by the Chicago Millwork Supply Co., 1424 West Thirty-seventh street, Chicago, Ill. The former contains a list of complete houses, *i.e.*, the millwork for complete houses, together with paints, hardware and house and farm furnishings. It is a catalog that should be of value to every builder. It will be sent free to anyone who requests a copy.

TRADE NOTES

Chicago Builders Specialties Company, Old Colony Building, Chicago, Ill., is distributing an exceedingly attractive catalogue of the machinery and general contractors supplies which it is prepared to furnish on short notice. The goods embrace about everything that a building contractor requires and in connection with the illustrations is to be found ample descriptive text. Special reference is made to the "Little Devil" concrete mixer concerning which we may have something more to say in another issue of the paper.

"Backus Heaters" is the title of an attractive *brochure* sent out by the Backus Heater Company, Brandon, Vt. These heaters are in the nature of portable steam radiators for gaseous fuel and are offered in styles and sizes to meet varying requirements.

Colgan Machinery & Supply Company, Columbus, Ohio, is distributing among its friends an illustrated folder setting forth the merits of the Champion Mortising machine with which by simply turning a crank the mechanic can cut a perfect mortise with straight sides and straight back. This mortise does not require to be chiseled out nor in making it is there danger of

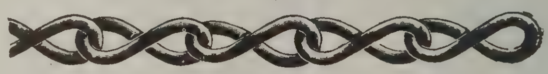
(*Continued on page* 84)

The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.

Sash Chains

Cable Chains

Jack Chains



Manufacturers of "GIANT METAL" Sash Chains

Manufacturers of "RED METAL" Sash Chains, Cable Chains, Jack Chains, Bell Hangers' Chains and Plumbers' Chains. Made in Brass, Copper and Steel.

WRITE FOR CATALOGUES AND PRICES.

We are the ORIGINATORS of SASH CHAIN as SUBSTITUTE for sash cord. In use over thirty years. Capacity of our chain plant 30 miles per day.

Are You a Leader or a Trailer?

YOU CAN DO IT WITH A REO

Traffic experts have figured that in only a few years from now 90 per cent. of the commercial hauling will be done by motor trucks.

Already, in your own field, contractors and builders are using motor trucks, and find their use profitable—not only in reducing the per ton mile cost of hauling, but in time saved and in the general quickening of every part of the business.

A Reo Motor Truck in your business will cut out costly delays and exasperating "fall-downs" in delivering goods and materials. Right on the minute and ahead of time means better business and more profits all along the line.

Reo Motor Trucks have won the approval of shrewd, carefully calculating business men in every line of industry—not only because of the remarkably low cost, $1650 for chassis with driver's cab, but because it has so many essentially modern and progressive features not found in other motor trucks.

Here are some of the features that mark the Reo as the most advanced type of medium heavy-duty motor truck now on the market: Reo Sectional Radiator, of 24 separate interchangeable units, may be repaired on the road anywhere; motor, clutch and transmission are cushioned on a sub-frame, away from jars and road-shocks; left-side drive, and the best and handiest center control ever brought out; big armored front frame; demountable driver's cab; gas headlights and Prest-O-Lite tank, and many other details of design and construction that mark the utmost advance in modern engineering practice.

These features mean sure, unbroken service, low upkeep cost, and that wide margin of safety that a motor truck must have to meet the frequent emergencies of extra service, bad roads and overloading, that cannot be otherwise forestalled.

Get Ahead of Competition

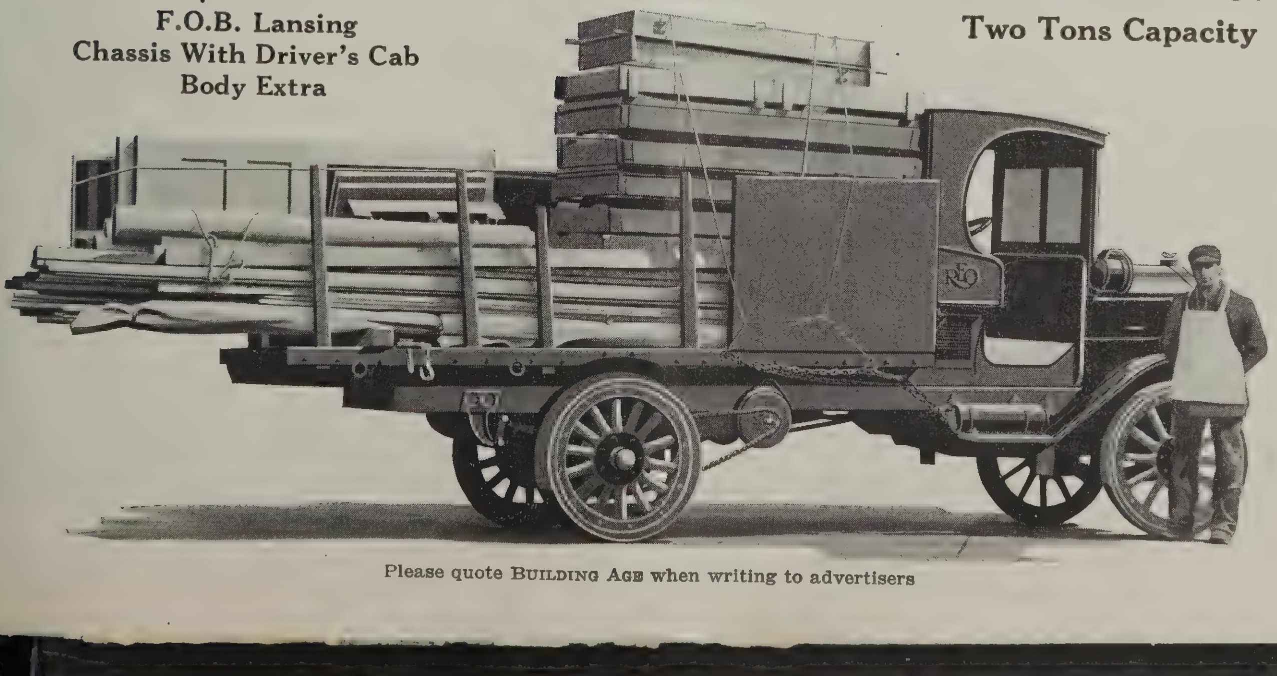
Don't wait until your competitor forces you to use motor trucks. Be a leader, and enjoy the profits and prestige that go to the man who uses modern methods and equipment.

We will gladly assist you with facts and figures, if you will tell us the conditions under which you are working. A Reo Truck Catalog and other helpful information at your disposal; write today.

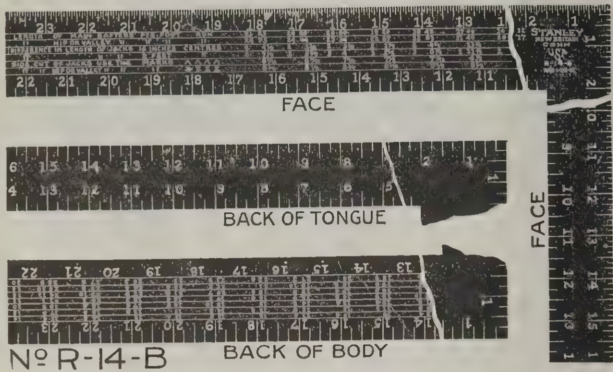
Reo Motor Truck Co.
Lansing, Mich.

$1650
F.O.B. Lansing
Chassis With Driver's Cab
Body Extra

REO Model J.
Two Tons Capacity



Stanley Tools



Nº R-14-B

Carpenters Steel Squares
A New Stanley Line

Stanley Steel Squares are made with the same careful attention to detail and the same high quality of material and workmanship as distinguishes all STANLEY TOOLS.

Every square is weldless, or, in other words, made from one piece of steel, and all four edges are machined. Particular attention is called to the finish of all numbers and the depth and accuracy of the graduation.

Special care has been given to the simplifying of all tables used, so that the workman can get the measurements he desires with ease and rapidity.

They can be furnished in a number of different styles and the variety of finishes offered include Royal Copper, Blued, Nickel Plated, Galvanized and Polished. All Royal Copper and Blued finished Squares have white enamel figures and graduations.

Each Square is packed in an anti-rust wrapper and this stamp STANLEY NEW BRITAIN CONN USA appears on the face of all numbers.

Send for special circular containing complete description.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

Trade **SIMPLEX** Mark
Reg. U. S. Pat. Office

NAILS

CUT COSTS

Simplex Nails have *four times* the head area of so-called large head nails.

Hence you can use fewer nails and still have a large margin of safety over others.

Result: Saving in labor and nails and a *better job*.

Insist that your prepared roofing be furnished with Simplex Nails.

Send for Sample and Circular

H. B. SHERMAN MFG. CO.
BATTLE CREEK, MICHIGAN

spoiling a door. The machine is a time and labor saving device, operates by hand, is automatic and adjustable and equipped with ball bearings and large gears. It is adjustable from a round hole to a 6¼-in. slot.

In accordance with a custom established some time ago in sending out card calendars for the different months of the year, the Richards-Wilcox Mfg. Company, Aurora, Ill., has recently distributed its calendar for April. This is embellished with a panel picture of the charming young lady who has posed for previous calendars sent out by the company, the picture showing her with pen in hand and evidently about to commence a letter. The picture bears the title "A Line Inspired by Fairness," and on the back of the card calendar the same sentiment is expressed but here it has reference to the Richards-Wilcox hangers. These it is pointed out "embody the spirit of fairness, which means that not only are they at the top of hanger efficiency but every ounce of ability of every individual concerned in their manufacture is blended in these. Maker, distributor and user benefit alike."

Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y., has just issued from the press a most interesting catalogue profusely illustrated with half-tone engravings and bearing the suggestive title "Fireproof Construction to Compete with Wood." It deals with the Van Guilder System of hollow wall construction, describes the machines by which the work is accomplished and presents numerous pictures showing buildings which have been erected by means of them. There are also testimonial letters from many builders who have used the company's machines in a practical way and there are given figures of estimated cost of the Van Guilder double wall concrete construction as compared with wood, brick, tile and block construction. A price list of Van Guilder Hollow wall machines, attachments, partition machines and mixers concludes the catalogue.

George E. Wilkinson, Jr., and Harold A. Moore, of Wheeling, W. Va., have formed a partnership with offices in the Register Building of that city for the purpose of handling all kinds of drafting, drawing and blue printing for architects, contractors and builders.

The Missouri Athletic Club holocaust in St. Louis with its loss of thirty or more lives receives considerable attention in the April issue of the Grinnell Automatic Sprinkler *Bulletin*, issued quarterly by the General Fire Extinguisher Company, Providence, R. I. The only reason there given for the disaster is that the building was not equipped with sprinklers. Reference is made to the destruction by fire of famous "College Hall" at Wellesley, Mass., on March 17, and to the fact that the damage would have been far less had the structure been equipped with automatic sprinklers. In fact the advantages of automatic sprinklers as a fire protection are considered in the April issue in a way to carry conviction to those who are inclined to at all seriously consider the matter.

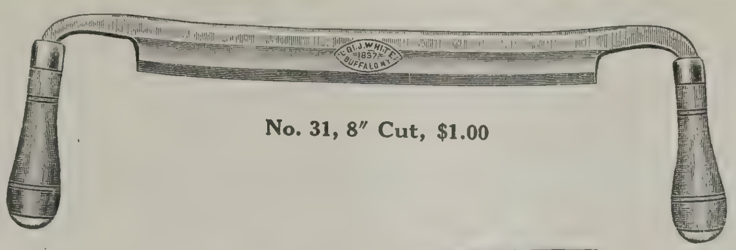
E. T. Von Knopke, architect, and J. M. O'Donnell, structural engineer, of Detroit, Mich., have combined their business and are now associate architects and engineers. They will be glad to receive catalogues and samples from manufacturers of all kinds of materials entering into the building construction.

The Asbestos Protected Metal Company, Beaver Falls, Pa., has removed its Pittsburgh office to 1611 Bennedum-Trees Building, with H. E. Marks continuing as district manager. Besides asbestos protected metal for roofing and siding this company now manufactures a complete line of prepared roofing and shingles to meet the requirements of all kinds of buildings.

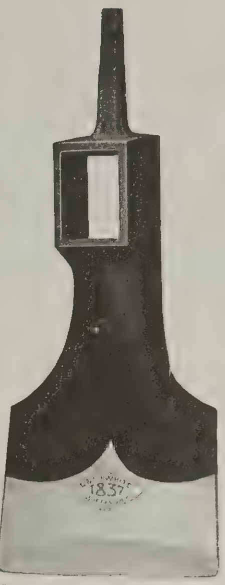
Chris Schlusing, who has just opened an office at No. 1 Broadway, New York City, for the general practice of architecture, desires to secure samples and catalogues from manufacturers of various materials used in building construction.

(*Continued on page* 86)

X2-1"
75c.



No. 31, 8" Cut, $1.00



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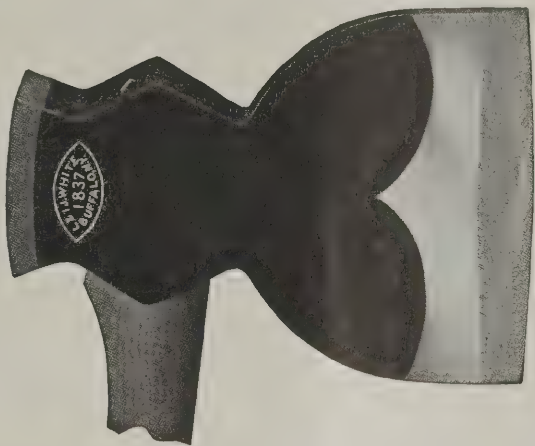


No. 27, 5" Cut, $1.10

Why Not Have The Best?

Every carpenter who has ever used our tools will tell you that WHITE'S are away ahead of all other tools—that they wear twice as long. If your dealer has our tools buy of him at the above prices—if he doesn't or won't order for you, send your order to us; we will pay postage on first order if you send this ad with your order.

The L. & I. J. WHITE CO., 100 Perry St., BUFFALO, N. Y.

There are Two Kinds of Sharpening Stones

THOSE THAT REALLY CUT AND THOSE THAT MERELY RUB

Carborundum Sharpening Stones

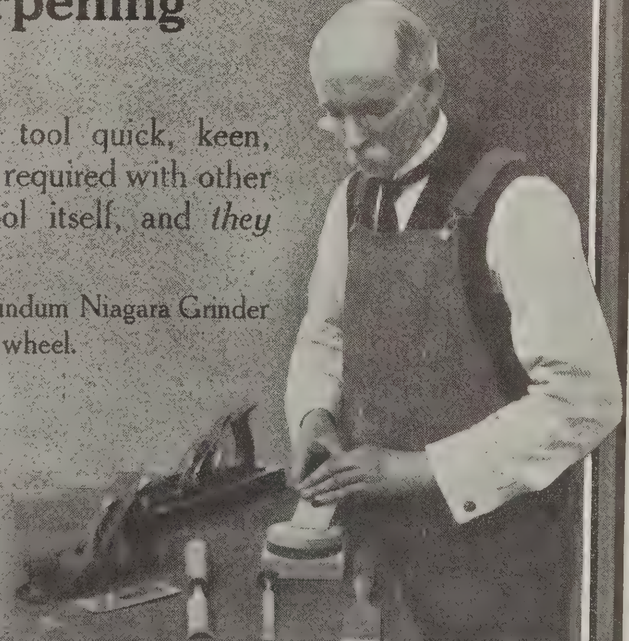
Really cut — they cut the edge on the tool quick, keen, smooth—they do the work in half the time required with other stones, and last almost as long as the tool itself, and *they hold their shape.*

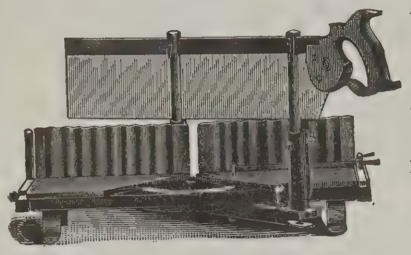
When tools need grinding put them on a Carborundum Niagara Grinder —a great little machine fitted with a Carborundum wheel.

BY INVITATION
MEMBER OF
RICE LEADERS OF THE WORLD ASSOCIATION
NEW YORK, U.S.A.

From your hardware dealer or direct.

The Carborundum Company
Niagara Falls, N. Y.





Goodell Mitre Box

Made of STEEL—Cannot Break

First in Quality and Improvements

Automatic Stops for holding up saw.

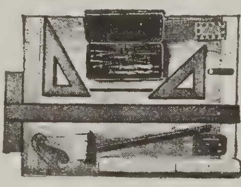
Corrugated Backs Graduated.

Gauge for Duplicate cuts and many other features.

If you want the best you will take no other.

Send for Circular K.

GOODELL MFG. CO., Greenfield, Mass.



DRAWING OUTFIT, $3.75

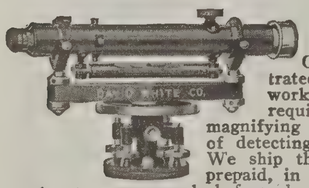
Complete, Regular $6.50, Special to Introduce Ourselves to Building Age Readers

Every Carpenter or Builder should have an outfit like this on hand. This outfit can be used for **Designing Any Job You Have,** from a chicken house to a skyscraper; useful to have around buildings while in course of construction.

OUTFIT consists of Board, T-Square, Triangles, Fine Set of Instruments, Scale, Tacks, Pencils, Rubber, Curve, etc. **Money back if not satisfactory in any way.**

We make a specialty of complete Outfits for the Carpenter and Builder, Architect, etc., with and without Drawing Tables. We make everything ourselves and sell direct. Our prices do not average over half the usual retail price. Send for complete catalogue W FREE. Remember we guarantee our tools in every way, and we refund money if buyer is not entirely satisfied or can duplicate our $3.75 special under $6.50 or our other outfits at proportionately higher prices. **Write at Once, NOW, Don't Delay**

The T-Square & Triangle Co., Baldwin Bldg., 32 Clinton St., Newark, N. J.

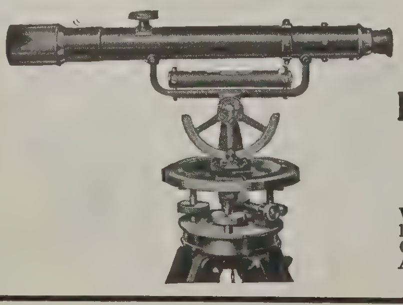


WHITE'S IMPROVED LEVEL

Shipped on Approval

Our No. 2011 improved level, illustrated herewith, is especially designed for work where a general purpose level is required. Telescope is 12" long with magnifying power 25 diameters and is capable of detecting an error of 1/16-inch in 300 ft. We ship this level out on approval, express prepaid, in order that you may try it out on your own work before deciding to keep it. Ask today for your circular X and special net price sheet. Ask today!

DAVID WHITE COMPANY
Dept. B, 419 E. Water Street **Milwaukee, Wis.**



The Yankee (A Compound Level)

Just the thing for the Arch.-Builder
An accurate level for moderate cost

Runs Horizontal and Vertical Angles.

Sold guaranteed by

Frost-Adams Co.

37 Cornhill, Boston, Mass.

Write for our catalogue of books for Carpenters, Builders, Architects, etc.

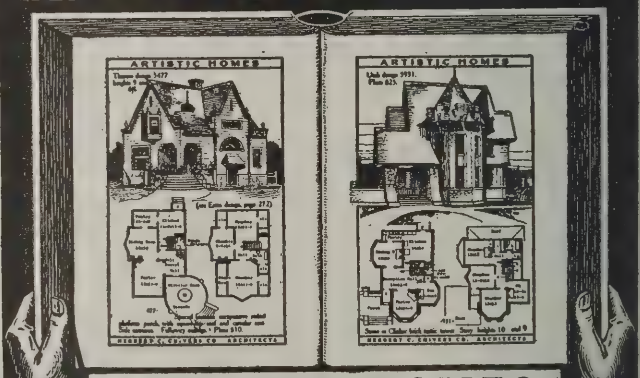
The Texla Land Corporation has just formed an architectural and construction department with offices at 18 Stark Building, Orange, Texas, and G. M. Monroe, the architect, would like to secure catalogues and price lists from manufacturers of building materials of all kinds.

R. I. Poole of the Department of Civil Engineering of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh, N. C., desires in connection with his practice of architecture to receive catalogues and samples from manufacturers of all kinds of materials entering into building construction.

Asbestolith Mfg. Company, No. 1 Madison avenue, New York City, is distributing an attractive folder in which are set forth the merits of Asbestolith flooring, sanitary base, wainscoting, trim, etc. The claim is made that it is impervious to heat, cold and dampness, is noiseless and elastic, will not chip, tear loose from its base nor disintegrate. It is said to be easily laid while in a plastic conditon on any surface and that it is ready for use in a few hours, making an excellent covering for old wood or cement floors.

The Chicago office of the Leader Iron Works, Decatur, Ill., will shortly have a new manager in Bert Templeton, Owego, N. Y., representative. W. V. Pettitt, the present manager, is to be assigned a new territory.

The Bostwick Steel Lath Company of Niles, Ohio, is sending out neat samples of the celebrated Bostwick "Truss-Loop" metal wall tie to all interested in these building materials. It is also mailing copies of its booklets, on "Stucco" and "Truss-Loop" metal lath. These interesting booklets are profusely illustrated and full of valuable information for contractors doing cement, stucco or light concrete work. The Bostwick Steel Lath Company will be glad to send either or both of the above to readers of *The Building Age* on application to the address given.



FINELY PRINTED NEW CUTS

ARTISTIC HOMES

A 1024-PAGE PLAN BOOK

SENT POST-PAID FOR $1.00

THIS BOOK IS HANSOMELY BOUND CONTAINING ABOUT 500 BUNGALOWS AND ABOUT 1000 HOUSE PLANS AND DESIGNS AND OTHER PLANS.

HERBERT C. CHIVERS
230 Stockton St. **San Francisco**
CONSULTING
ARCHITECT

THE BUILDING AGE

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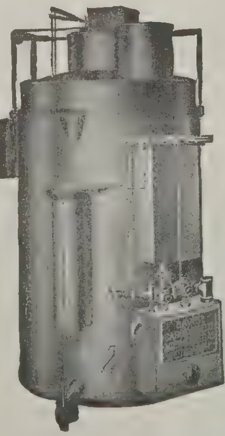

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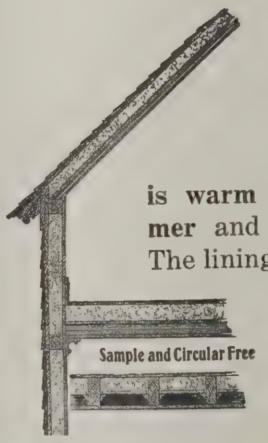

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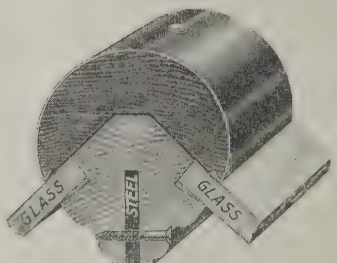

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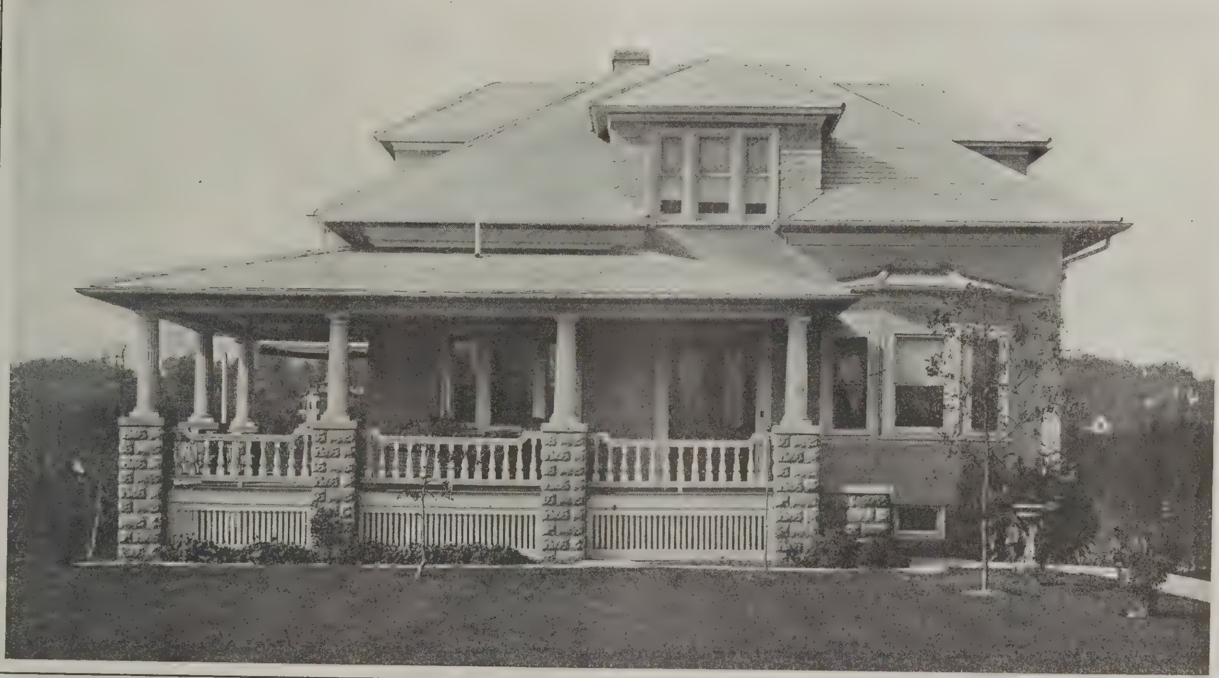
THE BUILDING AGE

NEW YORK, JUNE, 1914

A Stucco Cottage at Ridgewood, N. J.

A Design Which Represents a Composite of Ideas Gleaned from the Pages of "The Building Age"



A Stucco Cottage at Ridgewood, N. J., Designed, Built and Owned by Louis H. Kroder of That Place

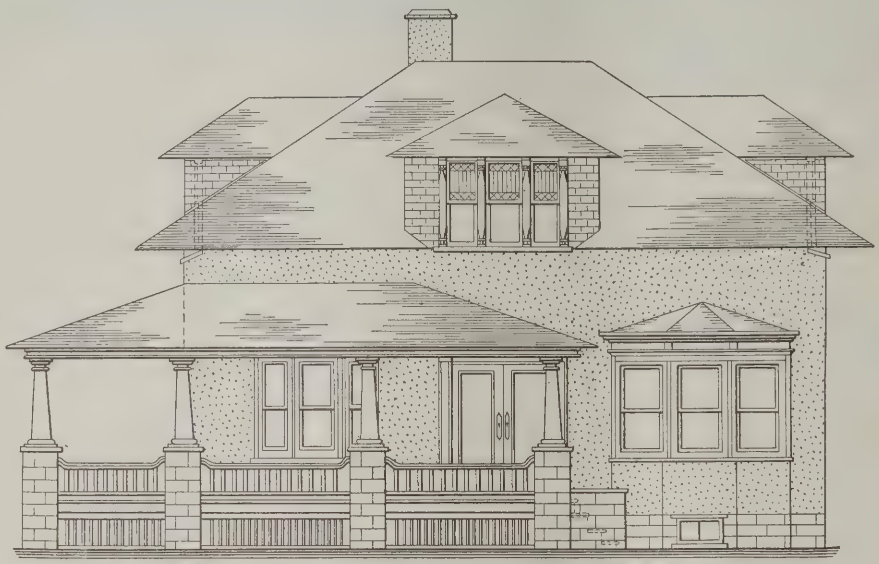
ONE of the striking features of *The Building Age* and one which has established for the paper an enviable reputation among those interested in building is the highly practical nature of the designs presented in its columns and the value of the technical information given in connection therewith. The published plans are continually utilized by interested readers as the basis of actual building operations in the erection of a home, suggestions being derived here and there from the multitude of designs given in the course of a volume and these are incorporated in the plan which is ultimately intended to meet some specific family requirements. In building up a plan by the prospective builder some features of a fireplace and mantel may perhaps be taken from one design that appeals to his requirements; in another it may be the position of the stairs and the means of lighting them which attracts his notice; in a third it may be the china closet that meets the particular needs he has in mind; in still another it may be the peculiar arrangement of certain of the rooms, and in still another it may be the scheme of having the toilet separate from the bath room and so on until a house has been planned which not only meets the wants of the housewife but involves all those conveniences which render the home a comfort and a blessing.

One of the more recent examples of a home built in this way and which in fact is a composite of ideas gleaned from various issues of *The Building*

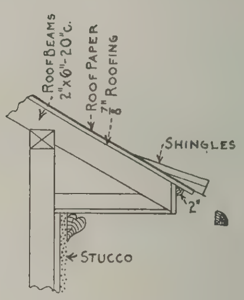
Age is that planned, constructed and owned by Louis H. Kroder, a builder and contractor, of Ridgewood, N. J., and which we illustrate herewith. Not only were the designs published in the paper carefully studied and viewed from all angles, but suggestions were adopted here and there as they appealed to him; he also carefully scanned the advertising pages and selected therefrom the names of concerns manufacturing important materials used in the construction of buildings. From many of these he secured his supplies and the nature of them is clearly indicated in the list which concludes this article.

The half tone engravings which are presented afford an excellent idea of the appearance of Mr. Kroder's cottage, the architectural treatment of the exterior as well as the finish in the more important rooms on the main floor. The various line drawings indicate features of construction while the floor plan shows the general arrangement of the rooms.

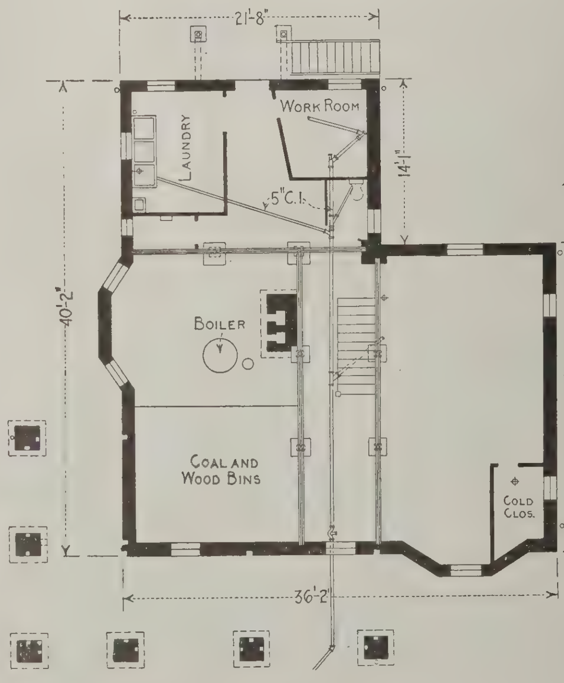
As one enters the house the library with its bay window is at the right of the hall and shut off from it by means of a sliding door. At the left is the living room and beyond it the dining room separated by sliding doors. At the rear of the house is the kitchen fitted with sink, gas range, dresser, etc., and communicating with the dining room through a commodious pantry. Adjoining the kitchen is the bath room and just in front of it is the linen closet. Beyond the library is a bedroom. The arrangement is such that the passageway under the upper part of the main stairs gives access to the front door direct from the kitchen without the necessity of passing through any other rooms. The attic



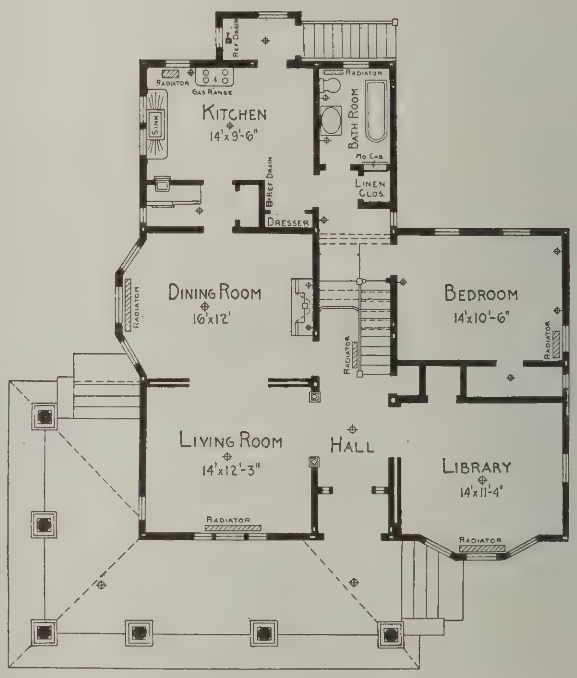
Front Elevation—Scale 3-32 In. to the Foot



Detail of the Main Cornice—Scale ¼ In. to the Foot



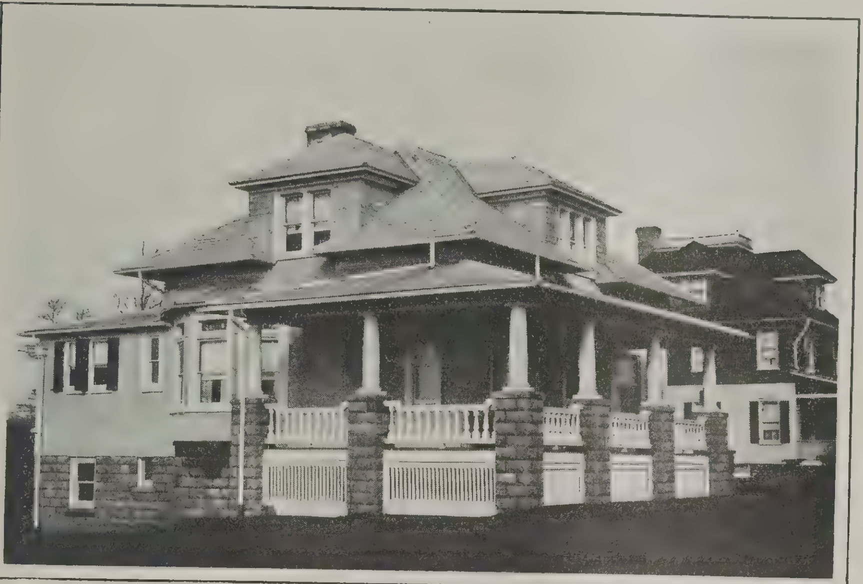
Foundation Plan—Scale 1-16 In. to the Foot



Main Floor Plan with Outline of Veranda Roof—Scale 1-16 In. to the Foot

A Stucco Cottage at Ridgewood, New Jersey—Plans, Elevation and Detail space is divided so as to give several bedrooms.

Concrete footings are used under all foundations, columns, brick piers, area walls and chimney, the concrete under the foundation walls being 12 in. thick and extending 6 in. beyond each face of the wall. The tops of the footings are 2 in. below the level of the finished cement floor in the cellar. The concrete is composed of one part Portland cement, three parts sand and six parts gravel. The underpinning, porch piers, etc., as shown in the pictures, are of 12-in. rock face cement blocks with grooved block joints set in Portland cement mortar.



A Stucco Cottage at Ridgewood, N. J.—View of Exterior Showing Kitchen Extension and the Well Broken Lines of the Main Roof

The floor of the cellar is covered to a thickness of 4 in. in depth with concrete mixed in the proportions of one part Portland cement to three parts sand, gravel and stones. On this is placed a 1-in. top coat of Portland cement and clean, sharp sand mixed in the proportions of 1 to 1½.

The framing timbers are of spruce throughout. The floor joists are 2 x 10 in., placed 16 in. on centers; the sills are 4 x 6 in., the porch ceiling joist 4 x 8 in. and rafters 2 x 6 in., the latter placed 20 in. on centers. The outside walls where shown on the elevations are covered with cement stucco applied to expanded metal lath. This stucco was ready-made colored cement and it was only necessary to add water to prepare it for use.

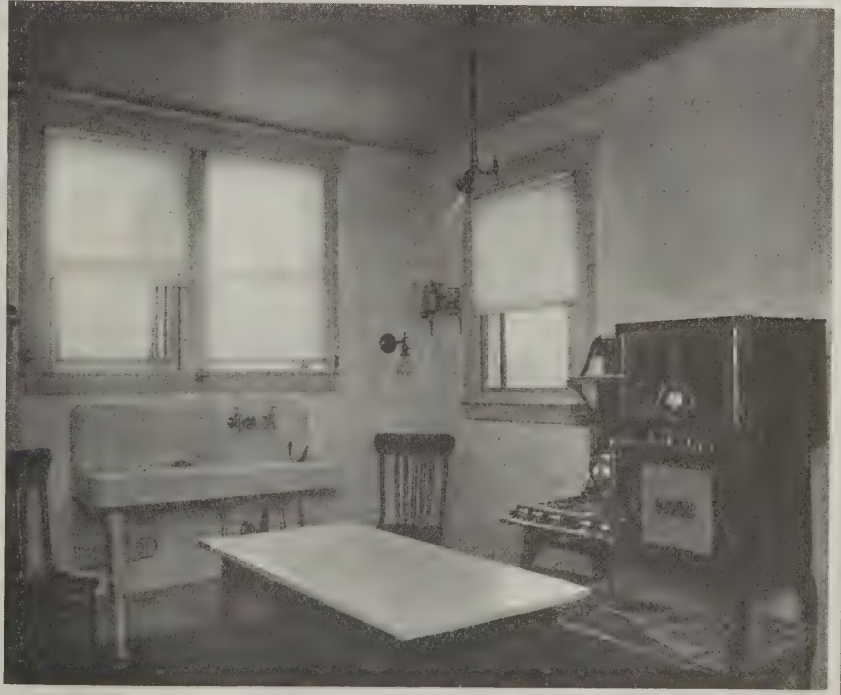
The roof is covered with asbestos shingles and is surmounted by a 15 in. galvanized iron Globe ventilator which is intended to ventilate the attic.

The veranda extending across the front of the house and partially around the living room side has "Koll's" Patent Lock Joint columns. The under side of the rear and side porch roofs as well as of the main roofs and dormers is ceiled with ⅞-in. tongued and grooved North Carolina pine ceiling. The soffits of all cornices and overhangs are ceiled with ⅞ x 3-in. North Carolina pine. The frames for outside doors have 2-in. oak sills and 1½-in. white pine jambs. The window frames have 2-in. sills, ⅞-in. outside casing and 1⅛-in. pulley stile which is tongued into the outside casing. Cellar windows have plank frame. The cellar sash is hinged at the top to swing in.

The windows in the living room, dining room, library, kitchen and bedroom are glazed with double thick glass. Where so indicated on the elevations it is set in leaded diamond lights. The rear window in bath room and in folding sash at stair landing has leaded glass and some inside doors are so glazed. The side lights of the vestibule doors and transoms are also leaded glass.

The trim of the halls, stairs, living room and vestibule is in birch selected for its color and grain. The windows have 1⅛-in. stool and 4-in. molded apron. The molded trim of the rooms is ⅞ x 4½-in. with additional ⅞ x 1⅛-in. back band planted on edge.

The trim of the dining room and library is of quartered oak and in the bedroom it is of cypress. The trim of the kitchen and bath room as well as the bedrooms in the attic is of white wood.



A Corner in the Kitchen of the House Showing Gas Range and Sink

The dining room is wainscoted 6 ft. in hight and is provided with plate rail as indicated in one of the interior views. In the first floor hall is a dado

20 in. high, and in the vestibule is a panel wainscoting 6 ft. 6 in. high. The opening from the hall into the living room has 8-in. pilasters and 8-in. turned columns with Compo ornamental caps, all of birch. The bases are 20 in. high to conform with the dado.

The dressers in the pantry have glass doors above, enclosing three shelves, and have cupboards below. The kitchen dresser starts from a point 4 ft. above the floor and extends to the ceiling.

The front and vestibule doors are veneered on a white pine core showing birch where exposed in the vestibule and the first floor hall. They are glazed with 3/16-in. plate glass with 1½-in. bevel. The interior doors throughout are of the "Morgan" Kore Lock type, and all are birch except the sliding doors and the double acting door to the dining room which are oak on one side.

The mantel in the dining room is laid up in brick, the design having been copied from a wood mantel.

The vestibule, fireplace hearth and bath room have concrete beds of the same mixture as that specified for the floor of the cellar and are for the purpose of supporting the tile flooring. This flooring is made up of 1¼-in. wide herring bone tile laid in cement with a 6-in. colored border.

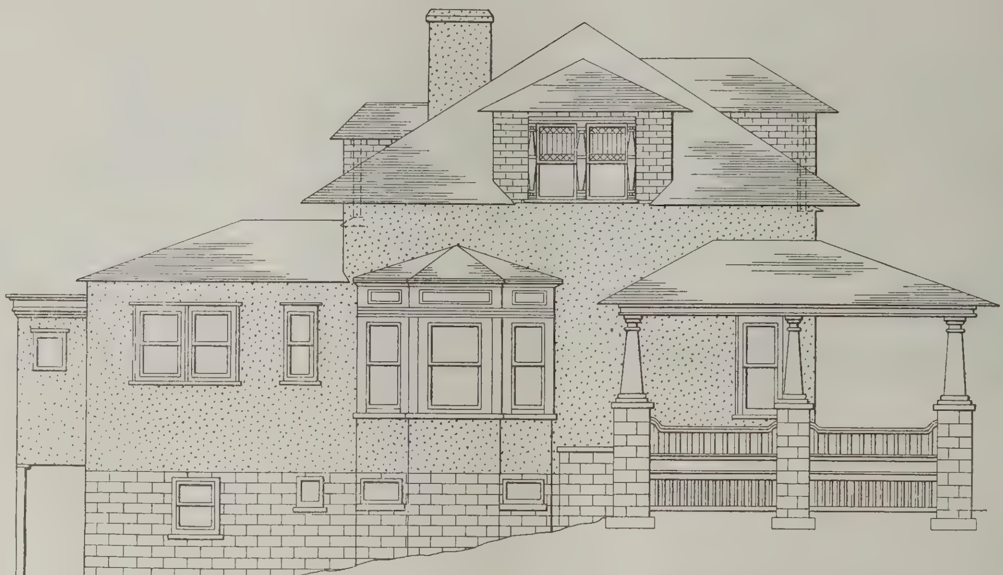
The walls of the bath room are tiled 4 ft. 6 in. high with 3 x 6-in. "Rim Back" white glaze surface tiling 3 in. thick, and have colored border, rounded corners at the angles, plain tile cap mold, a 6-in. plain tile sanitary base and tile base blocks for the door trim 6 in. high.

In the kitchen behind the gas range and for a distance of 5 ft. in width the wall is covered for a distance of 4 ft. 6 in. in hight with Rim Back glaze white 3 x 6-in. tile with 2-in. tile mold cap and 6 in. sanitary base.

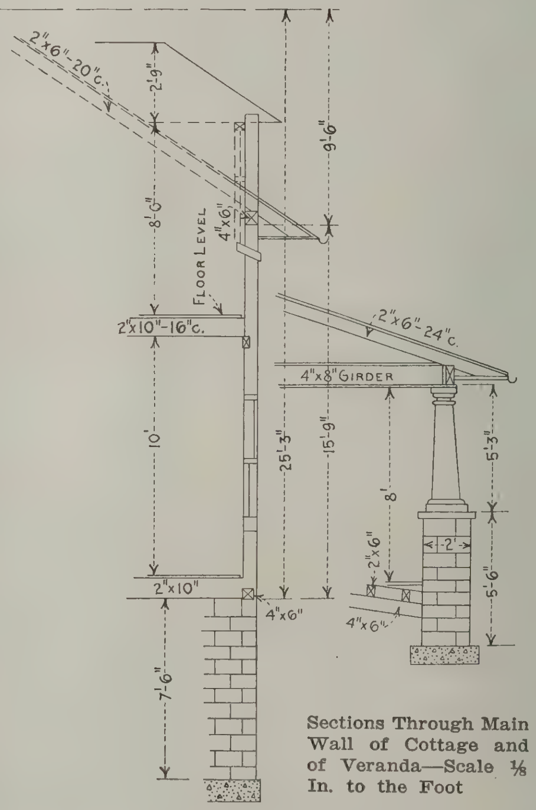
In the wall over the gas range is a 12 x 12-in. grille black japaned register with concealed louvres and nickel plated china handles marked "Open" and "Shut." There is an 8 x 10-in. tin duct between the joist connecting with register in outer wall.

The walls and ceilings of the rooms on the first floor as well as the stair hall are lathed and plastered with two-coat work, the latter being applied on top of Sackett's plaster board. Metal corner beads are used full hight at all external plaster angles.

The laundry is in the basement and is fitted with three part Alberene soapstone wash trays with galvanized iron covers. There is also a dark room for developing photographic negatives, this space being marked on the plan as "work room."



Side (Left) Elevation—Scale 3/32 In. to the Foot



Sections Through Main Wall of Cottage and of Veranda—Scale ⅛ In. to the Foot

A Stucco Cottage at Ridgewood, N. J.

The house is piped for gas and wired with B. X. cable for electric lighting, combination fixtures being provided. A gas outlet is supplied in the kitchen for the gas range.

The plumbing fixtures include sink and drain

A Stucco Cottage at Ridgewood, N. J.—View from Dining Room Looking Into Living Room

View in the Library Looking Toward the Bay Window

boards in the kitchen, a bath tub, a wash basin and closet in the bath room, a wash basin in the attic and a closet in the basement.

The house is heated by steam, the boiler in the cellar connecting with the chimney by means of a 9-in. smoke pipe. The radiators in the various rooms and halls are of sufficient sections to furnish a comfortable temperature.

All exterior woodwork was treated to three coats of white lead and linseed oil paints, and the porch floors to three coats of lead and oil, and all metal and iron work one coat of red metallic paint and one coat of red lead and oil. All tin roofs were treated to two coats of Prince's metallic paint.

The following materials used in the construction of the cottage were furnished by the concerns mentioned, the names having been taken from reading and advertising pages of *The Building Age*,

Century Asbestos Shingles by Keasbey & Mattison Co., Ambler, Pa.

Porch columns by the Hartmann-Sanders Company, Chicago, Ill.

Globe Ventilator by Globe Ventilator Company, Troy, N. Y.

Expanded metal lath by Berger Mfg. Company, Canton, Ohio.

Plumbing fixtures by the Standard Sanitary Mfg. Co., Pittsburgh, Pa.

Hair lined Quilting around entire building by H. W. Johns-Manville Co., New York City.

Doors by the Morgan Company, Oshkosh, Wis.

Hardware, bronze metal with cut glass knobs by Sargent & Co., New York City.

Boiler and radiators by American Radiator Co., Chicago, Ill.

Electric light fixtures by Miller & Co., New York City.

Glimpse of Dining Room, Showing Fireplace and at the Right the Stair Hall

Supervision of Buildings and Their Construction in New York City

Those who are at present engaged in building operations in New York City experienced no little difficulty in carrying through work to its ultimate conclusion by reason of the number of departments which must pass upon the work and equipment.

At present there are fourteen departments, boards or bureaus that have jurisdiction over matters affecting buildings, as follows:

Bureau of Buildings, Tenement House Department, Fire Prevention Bureau, Bureau of Combustibles, Department of Water Supply, Gas and Electricity, Police Department, Bureau of Boiler Inspection, Bureau of Licenses, Department of Docks and Ferries, Department of Parks, Department of Health, Department of Highways, Industrial Board and the United States Agriculture Department.

The jurisdiction of the various departments is constantly overlapping and while one department may order an owner to do certain things in connection with his building, he, in attempting to comply, frequently finds that he is in conflict with some other bureau or department. Hardly a year passes, according to a report of the Real Estate Board of New York, in which some new board, commission or bureau is not created by either the Legislature or the Board of Aldermen to regulate or supervise something relating to buildings.

In order to conduct a building operation in the city in many instances it is often necessary to secure permits from three to eight different bureaus or departments which is regarded as a needless and unnecessary expense.

The expert of the Real Estate Board suggests that the rational and effective remedy would be to consolidate the various departments, bureaus or commissions that may have to do with buildings into one great department which should have exclusive jurisdiction over all matters pertaining to buildings of every description including the issuance of licenses for theatrical and other shows.

◆

Cement Houses for Industrial Workers

The advent of the "poured" concrete house as a home for the workingman has resulted in the carrying out of a number of building operations involving this form of construction, the idea being to provide houses of low rental which will be well adapted to the needs of industrial workers. Among some of the more important operations just projected is that of the Crucible Steel Company of America, which will erect 500 concrete houses for its workmen near Pittsburgh, Pa.; the Philadelphia & Reading Coal & Iron Company will erect 200 similar houses at Pottsville, Pa.; the Loyal Hanna Coal and Coke Company expects to build 200 at Johnstown, Pa.; the United States Steel Corporation has planned several hundred near its plants at Pittsburgh, Pa., and Gary, Ind., and Henry Ford, the well-known automobile manufacturer of Detroit, Mich., has in contemplation the erection of 2,000 houses for his workmen. These indestructible five and six-room cement houses may be built, it is claimed, for not more than $1,000 each.

Measures for Fire Prevention

At the eighteenth annual meeting of the National Fire Protection Association the following measures were advocated in its warfare against the needless sacrifice of human lives and property by fire:

(1) The encouragement of fire-resistive building construction through the adoption of improved building codes by all states, cities and towns. The inclusion in such codes of adequate rules for exit facilities based on the occupancy for all buildings.

(2) The adoption of laws or ordinances requiring the installation of automatic sprinkler systems as fire extinguishing agents in all factories, commercial establishments and city blocks. The adoption of ordinances requiring the construction of fire division walls not only as a property protecting device but as providing the best life-saving exit facility.

(3) The establishment by law of a fire marshal in every state, who shall be a trained man with trained assistants competent to direct the work as statistician, educator and prosecutor.

(4) The investigation of the cause of all fires by public officials.

(5) The consolidation of all legal forces so as to provide for the systematic inspection of all buildings by local firemen, and technically trained building and factory inspectors so as to insure the vigorous enforcement of rules for cleanliness, good housekeeping, and the maintenance of safe and unobstructed exits, fire-fighting apparatus and other protective devices.

(6) The especial safeguarding of schools, theatres, factories and all other places in which numbers of people congregate or are employed.

(7) The vigorous state and municipal regulation of the transportation, storage and use of all inflammable liquids and explosives.

(8) A careful study of municipal water supplies, their adequacy and reliability with special reference to their adequacy in case of conflagrations.

(9) The universal adoption and use of the safety match.

(10) The education of children and the public generally in careful habits regarding the use of fire.

◆

Builders Wages in 1913

According to a statement issued May 9 by the Bureau of Labor Statistics at Washington, D. C., the average weekly wage in forty leading cities of the United States for more than sixty industries was higher on May 15, 1913, than on May 15, 1912, except that of the mill work carpenters. The following are some of the increases made in the period stated:

Bricklayers	1.7 per cent.
Carpenters	1.7 per cent.
Hod carriers	1.3 per cent.
Painters	4.2 per cent.
Plasterers	1 per cent.
Plumbers and gas fitters	3.1 per cent.
Structural iron workers	2.6 per cent.
Stone cutters	2.2 per cent.

The highest scales per hour paid in May, 1913, in the above trades were as follows:

Bricklayers, 87½ cents in Dallas and San Francisco.
Carpenters, 65 cents in Chicago.
Hod carriers, 50 cents in Portland, Salt Lake City and San Francisco.
Painters, 65 cents in Chicago.
Plasterers, 87½ cents in San Francisco.
Plumbers and gasfitters, 81¼ cents in Seattle.
Structural iron workers, 75 cents in San Francisco.
Stonecutters, 70 cents in Portland.
Iron moulders, 50 cents in San Francisco.

The bureau reports that thirty-four trades showed a reduction of hours between May, 1912, and May, 1913; twenty-eight reported no change and one reported an increase.

◆

Convention of Building Owners and Managers

The annual convention of the National Association of Building Owners and Managers is to be held at Duluth, Minn., July 14 to 17 inclusive. A number of interesting papers have been promised, among which is one on workmen's compensation by F. R. Jones, secretary of the Workmen's Compensation Publicity Bureau of New York. The secretary of the association is C. A. Patterson, 918 City Hall Square Building, Chicago, Ill.

How Mill Work Should Be Listed

Some Suggestions for Properly Filling Out an Order for the Planing Mill—Sample Schedule Slips

By John Wavrek, Jr.

IT would be greatly to the credit of many of our good friends, the builders, if they would devote a short time to informing themselves as to the method of filling out an order for the planing mill, so that the mill people could more readily understand exactly what is wanted.

It being a part of my duty to write out orders for the mill, I handle very many of these orders as they are sent in by the contractors—oftentimes by mail from a considerable distance—and if things are not written out intelligently and clearly I can assure you it is a rather difficult proposition to interpret rightly what is really wanted and incidentally to avoid mistakes. Although most of the contractors and foremen are very excellent mechanics and know exactly what is wanted, it is, nevertheless, a deplorable fact that they sadly neglect to inform themselves as to the method used by planing mills in writing out orders for the mill men. It is also very apparent that most of them have sadly neglected their drafting, for I find very few of them can make a presentable sketch which would often be an aid in making clear their needs, and owing to the fact that there is no accompanying sketch makes it so much more difficult to understand what is meant.

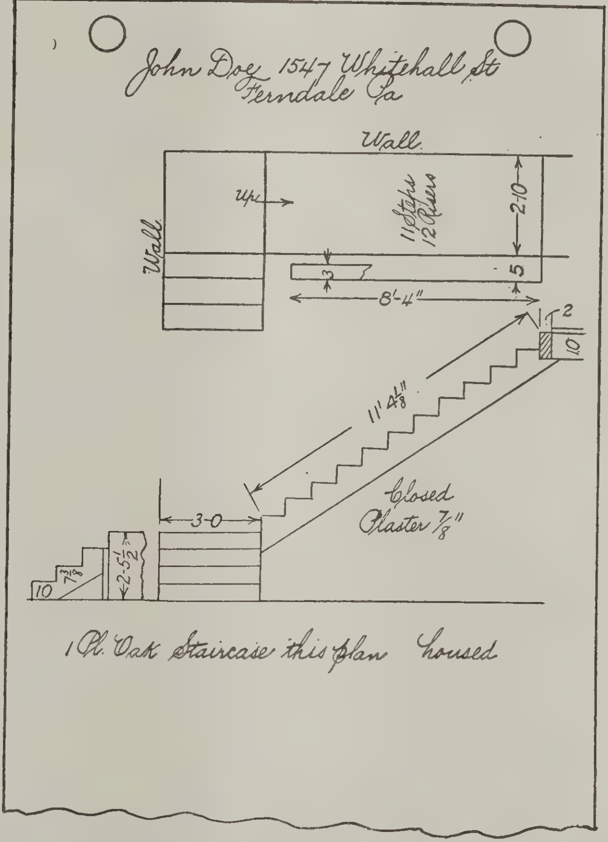
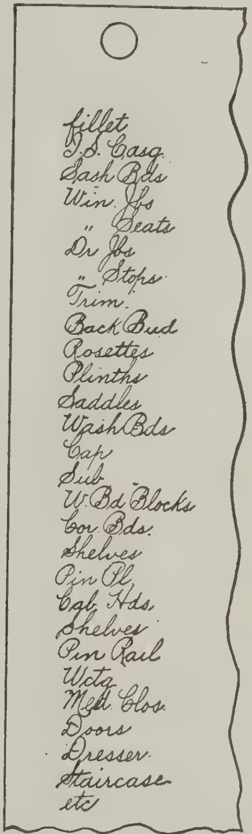


Fig. 1—Specimen Measuring Slip for the Stair Builder

How Mill Work Should Be Listed



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W. Bd. Blocks
Cor. Bds.
Shelves
Pin Pl.
Cab. Hds.
Shelves
Pin Rail
Wctg
Med. Clos.
Doors
Dresser
Staircase
etc

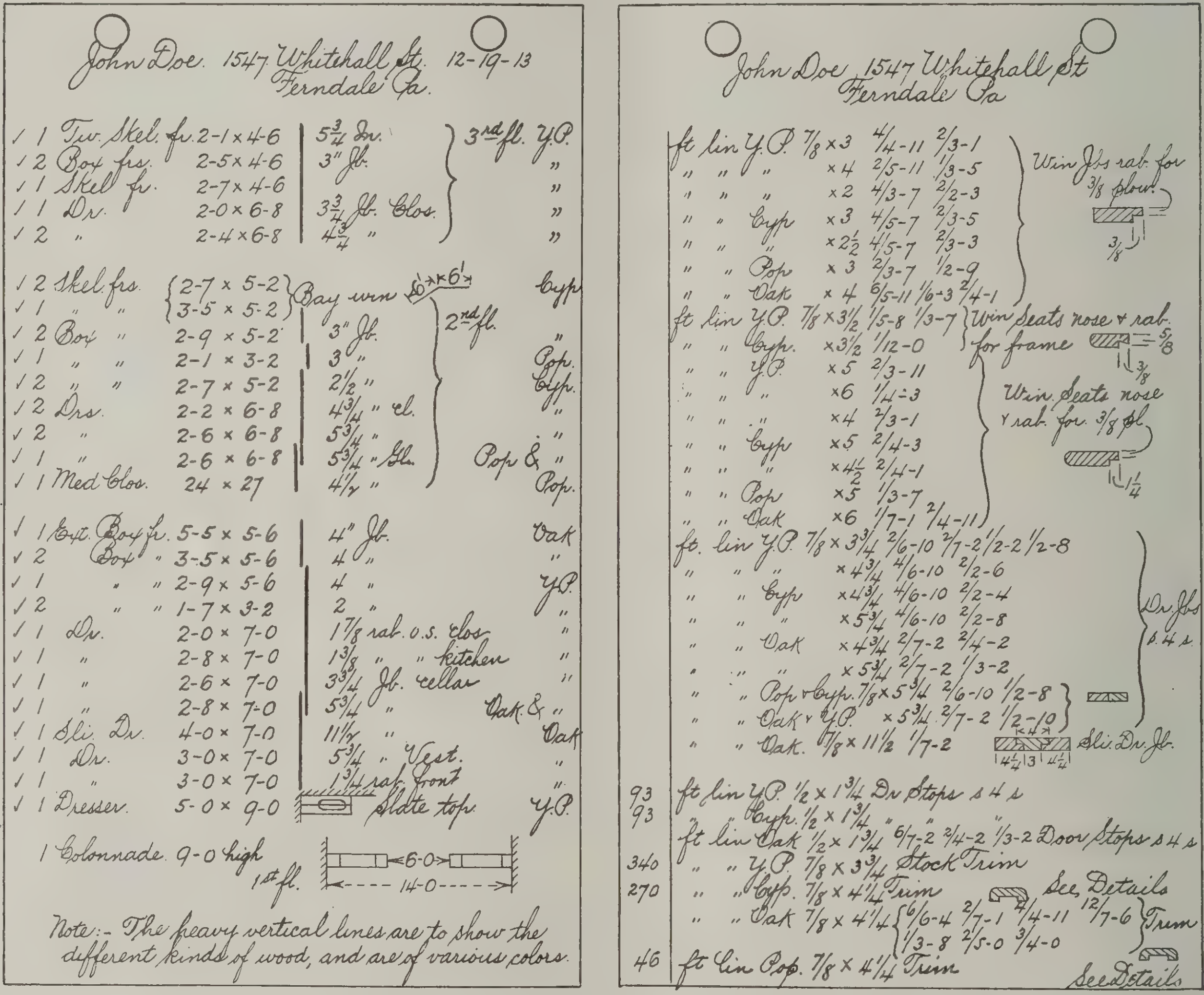
Fig. 2—Specimen Slip Showing Mill Work to Be Listed and the Order in Which It Is Taken Down

Because of these shortcomings of a considerable number of carpenters, there are many mistakes made involving delays in the completion of a job, and, what is more serious, an unnecessary loss of money, most of which could be avoided if the men in question would inform themselves on the subject and write their orders so that they would be concise and readily understood by the planing mill people.

The younger mechanics have to a large extent overcome this defect because they keep in step with the modern trend and inform themselves by reading and studying the different journals of their respective trades, which have all the information needed in their particular work, but very many of the older men neglect to inform themselves on these subjects and are, therefore, at a disadvantage because of this fact.

One particular feature in which many carpenters are lacking is the terms which are applied to the different shapes of moldings. They will insist in calling any molding of considerable size an "ogee" regardless of the fact that it may be a cove, a hollow and round or an ovolo. The fact that they want it for a crown mold is to them sufficient evidence that an ogee is required. I remember on one occasion a carpenter told me in evident seriousness to send him so many feet of gossip molding (meaning gothic).

In placing an order for window seats the mistake is frequently made in not stating whether it is required for a brick frame or a skeleton, and as there is a difference in the make up of the two the mill man is at a loss to know as to what is actually wanted, and must, in order to avoid mistakes, inquire before the order can be made. If the order has been sent by mail from a considerable distance it can readily be realized what loss of time the oversight may occasion. Another mistake which very frequently occurs is in ordering sash. It is an accepted rule in most mills to give the width first and then the hight in case of doors and sash. Therefore, if a single sash is ordered and this rule is reversed then it will naturally follow that the sash is wrong because the bottom rail, being wider, cannot be used, owing to the fact that the order was not made according to this rule. This has often happened, to my personal knowledge.



John Doe. 1547 Whitehall St. 12-19-13
Ferndale Pa.

✓ 1 Tw. Skel. fr. 2-1 × 4-6 | 5¾ Dr. } 3rd fl. Y.P.
✓ 2 Box frs. 2-5 × 4-6 | 3" Jb. "
✓ 1 Skel fr. 2-7 × 4-6 | "
✓ 1 Dr. 2-0 × 6-8 | 3¾ Jb. Clos. "
✓ 2 " 2-4 × 6-8 | 4¾ " "

✓ 2 Skel. frs. 2-7 × 5-2 } Bay win 6'4 × 6'4 Cyp
✓ 1 " " 3-5 × 5-2
✓ 2 Box " 2-9 × 5-2 | 3" Jb. } 2nd fl. "
✓ 1 " " 2-1 × 3-2 | 3 " Pop.
✓ 2 " " 2-7 × 5-2 | 2½ " Cyp.
✓ 2 Drs. 2-2 × 6-8 | 4¾ " cl. "
✓ 2 " 2-6 × 6-8 | 5¾ " "
✓ 1 " 2-6 × 6-8 | 5¾ " Gl. Pop & "
✓ 1 Med Clos. 24 × 27 | 4½ " Pop.

✓ 1 Ext. Box fr. 5-5 × 5-6 | 4" Jb. Oak
✓ 2 Box " 3-5 × 5-6 | 4 " "
✓ 1 " " 2-9 × 5-6 | 4 " Y.P.
✓ 2 " " 1-7 × 3-2 | 2 " "
✓ 1 Dr. 2-0 × 7-0 | 1⅞ rab. o.s. clos "
✓ 1 " 2-8 × 7-0 | 1⅜ " " kitchen "
✓ 1 " 2-6 × 7-0 | 3¾ Jb. cellar "
✓ 1 " 2-8 × 7-0 | 5¾ " Oak & "
✓ 1 Sli. Dr. 4-0 × 7-0 | 11½ " Oak
✓ 1 Dr. 3-0 × 7-0 | 5¾ " Vest. "
✓ 1 " 3-0 × 7-0 | 1¾ rab. front "
✓ 1 Dresser. 5-0 × 9-0 Slate top. Y.P.

1 Colonnade. 9-0 high 1st fl. 6-0 14-0

Note:- The heavy vertical lines are to show the different kinds of wood, and are of various colors.

John Doe 1547 Whitehall St
Ferndale Pa

ft lin Y.P. 7/8 × 3 4/4-11 2/3-1 } Win Jbs rab. for 3/8 plow. 3/8
" " " × 4 2/5-11 1/3-5
" " " × 2 4/3-7 2/2-3
" " Cyp × 3 4/5-7 2/3-5
" " " × 2½ 4/5-7 2/3-3
" " Pop × 3 2/3-7 1/2-9
" " Oak × 4 6/5-11 1/6-3 2/4-1
ft lin Y.P. 7/8 × 3½ 1/5-8 1/3-7 } Win Seats nose & rab. for frame 5/8 3/8
" " Cyp. × 3½ 1/12-0
" " Y.P. × 5 2/3-11 } Win. Seats nose & rab. for. 3/8 pl. 1¼
" " " × 6 1/4-3
" " " × 4 2/3-1
" " Cyp × 5 2/4-3
" " " × 4½ 2/4-1
" " Pop × 5 1/3-7
" " Oak × 6 1/7-1 2/4-11
ft. lin Y.P. 7/8 × 3¾ 2/6-10 2/7-2 1/2-2 1/2-8 } Dr. Jbs s. 4 s.
" " " × 4¾ 4/6-10 2/2-6
" " Cyp × 4¾ 4/6-10 2/2-4
" " " × 5¾ 4/6-10 2/2-8
" " Oak × 4¾ 2/7-2 2/4-2
" " " × 5¾ 2/7-2 1/3-2
" " Pop & Cyp. 7/8 × 5¾ 2/6-10 1/2-8 }
" " Oak & Y.P. × 5¾ 2/7-2 1/2-10 }
" " Oak. 7/8 × 11½ 1/7-2 4 4¼ 3 4¼ Sli. Dr. Jb.
93 ft lin Y.P. ½ × 1¾ Dr Stops s 4 s
93 " " Cyp. ½ × 1¾ " " "
ft lin Oak ½ × 1¾ 6/7-2 2/4-2 1/3-2 Door Stops s 4 s
340 " " Y.P. 7/8 × 3¾ Stock Trim
270 " " Cyp. 7/8 × 4¼ Trim See Details
" " Oak 7/8 × 4¼ { 6/6-4 2/7-1 2/4-11 12/7-6 1/3-8 2/5-0 3/4-0 } Trim
46 ft lin Pop. 7/8 × 4¼ Trim See Details

How Mill Work Should Be Listed—Figs. 3 and 4—Specimen Slips of the Mill Man Who Takes Off the Necessary Measurements

In ordering a pair of sash the error is often made as to the number of lights required to the pair. Two lights are sometimes used, but the order reads for "one pair of sash, two lights," whereas it should read "four lights." Considerable saving of space can also be effected by using a concise method such as is outlined in the accompanying list of mill work and which has been used to advantage in the mill where I worked for a number of years.

In my job, which consists of measuring up and listing planing mill work, and which covers quite a lengthy experience, I have evolved a method both concise and efficient. If followed it will avoid many mistakes because I have a certain system which is always adhered to both in measuring and making out a working list for the planing mill men. It is not claimed, however, that my plan is infallible, for mistakes will creep in no matter how rigidly the system is adhered to, but it will tend to greatly reduce them. It is a well-known fact that most mistakes occur on work which is of an ordinary character, for the simple reason that the mind is not applied to such an extent as it is in the case of a more complicated and particular job.

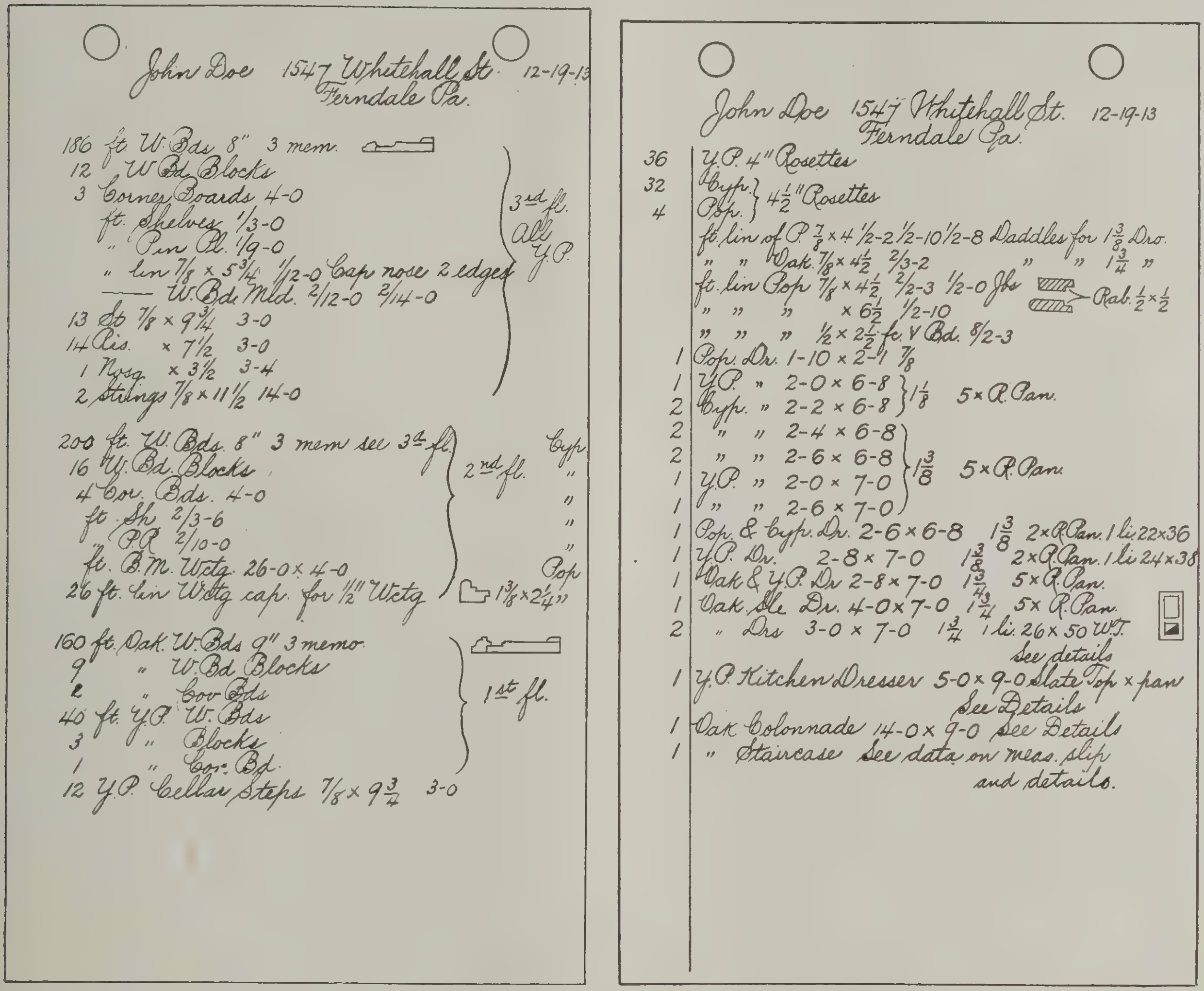
The specifications covering carpenter and millwork should be copied with typewriter on the estimate sheet, which sheet, together with the plans, should be carefully read over and taken along to the job which is to be measured and checked up, and if any changes are to be made they should be noted on the plan. We will assume that the house to be measured is of the better class, requiring different kinds of wood in the inside finish; the third floor, for example, being yellow pine, the second floor cypress, except the bathroom, which is to be in poplar, for painting or enameling, and the first floor is to be plain oak. My invariable rule is to start at the top—the third floor in this case—of the building and work down. Always start with measurements of the window frames; then the doors, wash boards, base blocks, corner beads, shelves, pin rail, cap for plaster railing if any; then steps, risers, nosing and strings. This would complete the third floor.

The second floor is taken in exactly the same rotation, except the staircase, which is measured last. After the shelves and pin rail comes the medicine closet, if any is required; then the wainscoting in the bathroom, and probably a bay seat, and last to be measured is the rear stairs to the first floor.

The first floor is gone through in the same way, including the kitchen dresser, colonnade, and last, but by no means least, the staircase. This latter item is very often measured up by the stair builder, but not necessarily so, if the measurer is able to make an intelligent sketch. I know of only a very few instances where our stair man took his own data.

If any millwork is required in the basement it is next taken up, then the outside steps, railings, etc.

Now in taking these measurements it is not necessary to mark down at the job all the different pieces that go to make up the finish, for oftentimes these newly plastered and sashless houses are very disagreeable to work in, but the data is written out as shown on the specimen slip.



John Doe 1547 Whitehall St. 12-19-13
Ferndale Pa.

186 ft. W. Bds 8" 3 mem.
12 W. Bd. Blocks
3 Corner Boards 4-0
ft. Shelves 1/3-0
" Pin Cl. 1/9-0
" lin 7/8 × 5 3/4 1/12-0 Cap nose 2 edges
—— W. Bd. Mld. 2/12-0 2/14-0
13 St 7/8 × 9 3/4 3-0
14 Ris. × 7 1/2 3-0
1 Nosg × 3 1/2 3-4
2 Strings 7/8 × 11 1/2 14-0
3rd fl. All Y.P.

200 ft. W. Bds. 8" 3 mem see 3d fl. Cyp
16 W. Bd. Blocks "
4 Cor. Bds. 4-0 "
ft. Sh 2/3-6 "
" P.R. 2/10-0 "
ft. B.M. Wctg. 26-0 × 4-0 Pop
26 ft. lin Wctg cap. for 1/2" Wctg 1 3/8 × 2 1/4"
2nd fl.

160 ft. Oak W. Bds 9" 3 memo.
9 " W. Bd Blocks
2 " Cov Bds
40 ft. Y.P. W. Bds
3 " Blocks
1 " Cor. Bd.
1st fl.
12 Y.P. Cellar Steps 7/8 × 9 3/4 3-0

John Doe 1547 Whitehall St. 12-19-13
Ferndale Pa.

36 Y.P. 4" Rosettes
32 Cyp.
4 Pop. } 4 1/2" Rosettes
ft. lin of P. 7/8 × 4 1/2-2 1/2-10 1/2-8 Daddles for 1 3/8 Dro.
" " Oak 7/8 × 4 1/2 2/3-2 " " 1 3/4 "
ft. lin Pop 7/8 × 4 1/2 2/2-3 1/2-0 Jbs Rab. 1/2 × 1/2
" " " × 6 1/2 1/2-10
" " " 1/2 × 2 1/2 fc. & Bd. 8/2-3
1 Pop. Dr. 1-10 × 2-1 7/8
1 Y.P. " 2-0 × 6-8
2 Cyp. " 2-2 × 6-8 } 1 1/8 5 × R. Pan.
2 " " 2-4 × 6-8
2 " " 2-6 × 6-8
1 Y.P. " 2-0 × 7-0
1 " " 2-6 × 7-0 } 1 3/8 5 × R. Pan.
1 Pop. & Cyp. Dr. 2-6 × 6-8 1 3/8 2 × R. Pan. 1 li. 22×36
1 Y.P. Dr. 2-8 × 7-0 1 3/8 2 × R. Pan. 1 li. 24×38
1 Oak & Y.P. Dr 2-8 × 7-0 1 3/4 5 × R. Pan.
1 Oak Sle Dr. 4-0 × 7-0 1 3/4 5 × R. Pan.
2 " Drs 3-0 × 7-0 1 3/4 1 li. 26 × 50 W.T.
See details
1 Y.P. Kitchen Dresser 5-0 × 9-0 Slate Top × pan
See Details
1 Oak Colonnade 14-0 × 9-0 See Details
1 " Staircase See data on meas. slip and details.

How Mill Work Should Be Listed—Figs. 5 and 6—Specimen Lists for the Planing Mill Taken from the Measuring Slips Shown in Figs. 3 and 4

To reduce the possibility of error to a minimum I mark my slips in the following manner: The items in yellow pine are marked with yellow pencil, cypress in brown, oak in red or any color one may choose. The important thing is to make some sort of a distinctive mark following these different items to denote at a glance what is wanted.

The work is done in the following manner and always in the same rotation. The different items to be listed are marked on a slip, a specimen of which is also shown herewith. Of these slips a number may be printed or typewritten and one used for each job, the items being checked off successively as listed. A certain series of check marks should be adopted for the measuring slip so that there may be no doubt as to what items were listed, in case one is interrupted, which happens more than a few times. However, a glance at the check marks on my slip shows me exactly where I had left off.

By following these rules it will be found that the chances of error are greatly reduced and the work has been listed in a concise manner and without taking up much space.

There are undoubtedly many different methods used in doing this work, and very likely some better than the one here outlined. As I am always willing to improve my knowledge, I would like very much to hear what methods are used by more able men who do this kind of work.

◆

A bungalow has recently been built at Desloge, Mo., by a woman who did all the work with her own hands from foundation to roof, employing a young farmer merely to assist her in raising some of the heavier timbers. Miss Emma McCarthy, the woman in question, is said to be seriously thinking of taking up architecture as a profession, for to her mind it is just as proper for a woman to build a house as to sew a dress.

Convention of N. J. Master Builders

A Well-Attended Meeting at Which Many Interesting Topics Were Discussed—Officers for the Ensuing Year

DEPARTING somewhat from the usual plan of devoting a considerable portion of the time to routine business and to a consideration of current problems, a rather wide range of topics was discussed at the annual election and quarterly convention of the New Jersey Master Builders Association which was held in Masonic Temple, Orange, N. J., on April 23. The subjects included "The Need of Closer Co-operation Between Employer and Journeyman," "The Effectiveness of Organization," "Fire Prevention" and "The Advantages of Commission Government." There were present nearly 100 delegates from all parts of the state, among the number being many representatives of the Material Dealers' Association, who were admitted for the first time in accordance with a revision of the By-Laws made a few months ago.

The President's Address

Mayor Frank J. Murray of Orange welcomed the delegates, after which President James S. Anderson of the Association delivered his annual address. He reviewed the work of the past year; outlined opportunities for development in the building industries; offered suggestions for increasing the membership of the city, county and state organizations of Master Builders; suggested that contests between the various counties might arouse interest; pointed out that prizes might be offered to the firms in the different branches of work that could show the best equipment in shop system or service, and called attention to the work of standing committees in an effort to effect reforms and secure laws suitable for new business conditions.

Following Mr. Anderson's address the convention committees were named and reports of the county vice-presidents were submitted.

Fire Prevention

Guy W. Culgin, chief inspector of the Fire Preventive Bureau of New York, spoke on fire prevention and showed how much of the safety even in buildings supposed to be fireproof depends on precautions against panics. One of the dangers of the fire escape was the bursting of flames from the windows of the lower floors of a building and to eliminate such a danger he recommended that all windows leading to fire escapes be provided with fireproof glass. He pointed out that among the ways builders can assist in making structures more fireproof is by refusing to install defective wiring, also by using fireproof material as far as possible. He also pointed out that buildings should be so constructed that smoke cannot reach bedrooms as many lives are lost through suffocation.

Benefits of organization both in business and government were emphasized in an address by J. George Fredericks, of New York.

Election of Officers

The officers elected to serve for the ensuing year were as follows:

President

James S. Anderson of Orange.

Vice-Presidents

Essex County	William W. Schoular of Newark.
Union County	H. A. Rath of Elizabeth.
Middlesex County	C. C. Christiansen of Perth Amboy.
Bergen County	H. T. Waltrey of Ridgewood.
Hudson County	J. M. Lothrop of Jersey City.
Passaic County	Jacob Englishman of Paterson.
Morris County	George E. Reeve of Morristown.
Monmouth County	W. H. White of Long Branch.
Mercer County	I. Harper Clayton of Trenton.
Camden County	William H. Casperson of Camden.
Somerset County	Herman Moosbrugger of Somerville.

Treasurer

Alfred J. Crowder of Newark.

Secretary

Victor P. Christofferson of Perth Amboy

The Banquet

In the evening the delegates were entertained at a banquet at the Plaza Hotel at which Joseph F. Gasner acted as toastmaster. Among the speakers were Mayor Murray, who talked about commission government; Building Inspector George P. Roberts of Orange and Mr. Colgin, who again spoke on the subject of organization and recommended the appointment of standing committees to look after legislation and suggested the use of trade literature for giving information on modern building construction. The entertainment during the evening included songs by a quartet.

By an amendment to the by-laws the office of financial secretary was created and this official will be elected at the next quarterly convention to be held in Plainfield.

Concrete Stairs in a Concrete Building

In discussing the construction of concrete buildings in a paper before the Boston Society of Civil Engineers, Leonard C. Wason advises casting the stairs considerably later than the floors and in a separate operation. In casting the floors, rods are left projecting from the floor to bond in the stairs, thus preserving the same measure of strength in the latter as would be the case were the whole job done at one and the same time.

When the Builder Mixes Concrete—III.

A Typical Case of Mixing with Shovels Illustrated and Described—Making New Work Stick to Old

By Hee H. See

IN the actual mixing of the concrete the man in charge will be governed by local conditions. It is not possible to consider all phases of this part of the work so we will just take a typical case. With the mixing board set up level in its proper place and arrangement made for the water supply, either through a hose connected direct or in a barrel large enough to hold more than sufficient for one batch, we are ready for work.

Before actually commencing, however, we wish to say that wherever possible one man be told off to handle the cement and water and tamp the concrete in the forms. It is his business to keep track of how many barrows of gravel have been dumped and to open and distribute the correct amount of cement over them. Opening and emptying cement is the meanest part of concrete work and if you can find a man who will always shake out of the sack all the cement and who thinks because he does not have to do any mixing that he has something of a snap, so much the better.

First we dump on the board three barrows of gravel. Upon this the cement man who has his sacks all opened to prevent delay dumps one sack of cement and with a shovel rakes it evenly over the gravel. Next come three more barrows of gravel and another sack of cement in the same way, and this operation is continued until we have enough for a batch. As the board becomes full of material the cement man keeps his eye on it and indicates where the gravel is to be dumped. When the material is placed in this manner it is already as well mixed as in the old way after the first turning.

Four men with shovels now take their places, one at each corner of the board and turn the material out to the sides, leaving it in two piles instead of one, all as shown in the picture, Fig. 8.

In turning the material the men do not shovel in the ordinary way. Instead of running the shovel directly into the heap and taking a shovelful from one point, they run the shovel along the edge of the heap in such a manner that the shovel is full by the time it reaches the center or the point where it would meet the opposite workman's shovel if both were keeping the same time. The shovel is then turned over and drawn backward, leaving the material scattered along the side of the board. I have tried to indicate this operation in Fig. 10, which is supposed to be a plan view of the material on the board after the first shovelful. Perhaps the best description of this method of shoveling would be to say that it acts in the same manner as a farmer's plow, only instead of turning the furrow as it goes along it picks it up going forward and turns it over as it comes back.

For the first few shovelfuls the shovel is barely raised from the board. As the heap gets larger it is raised just enough to keep the material back out of the way and the two piles separate. The less the shovel is lifted and the less the distance between the piles the less amount of energy required to turn the material and the less chance for the wind to blow all the cement out of it.

As soon as all the material is turned out into two piles at the sides of the board it is turned back to the center in the same way, leaving it in a heap as it was at first, but with the sand, gravel and cement now thoroughly mixed.

This is all the dry mixing the batch receives. It should now be so thoroughly mixed that it is all one color, and although we are aware that some authorities require the material to be turned three or more times dry, any further mixing than that already described is either a waste of time or the men do-

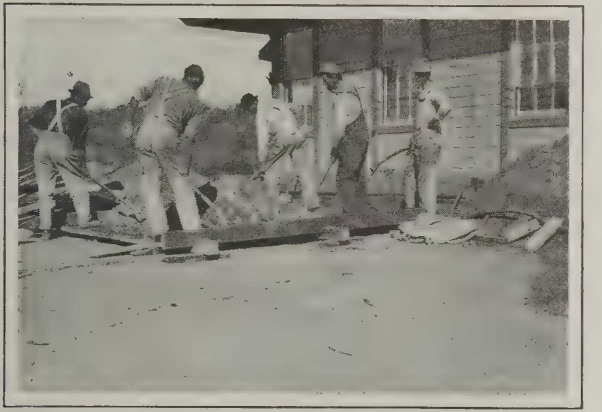


Fig. 8—The First Turning of the Material

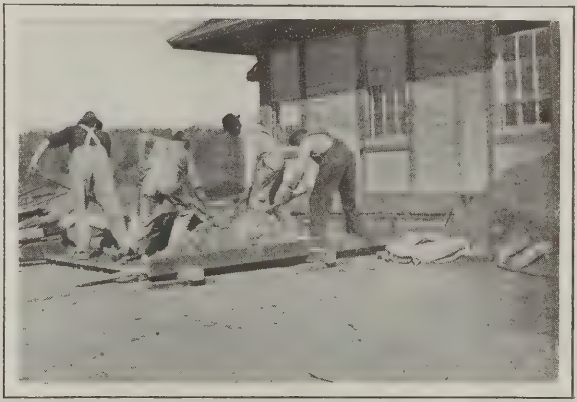


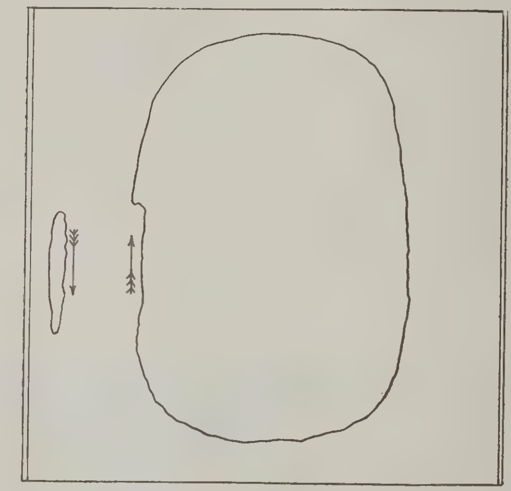
Fig. 9—The Material Ready for the Water

When the Builder Mixes Concrete—III.

ing the mixing are not getting proper supervision.

To wet the mixture two men should stand on each side of the heap as before and level a portion of it on the board to a depth of 3 or 4 in., as illustrated in the photographic view, Fig. 9. This is now thoroughly wetted with a hose for preference, though a bucket does almost as well. As soon as the amount leveled down on one side is wet, the men on that side shovel it out of the way to the side of the board, using some judgment in mixing the wet with the dry, but being careful to prevent any of the water running away, as it now contains a large percentage of the cement. To prevent this where the board is not quite level, the man on the lower side keeps a line of dry material as a dam just in front of his feet.

While the two men are turning over the wet material and raking down another layer from the heap the water is turned to the other side and so alternates from one side to the other until the batch has all been wet and all four shovels meet in the center of the board. The material is now turned back to the center again—the man with the water watching and wetting any portions that need it—and it is then ready for the forms.



When the Builder Mixes Concrete—Fig. 10—Diagram Showing Method of Turning Concrete

This is our usual method, but circumstances alter cases and variations of this method are sometimes used. Quite often, instead of four men turning the last time, only two turn, depositing the material near one end of the board from whence the other two shovel it directly into the form. It all depends upon conditions which are hard to describe, but readily discernible to the man on the job.

The number of men that can be economically handled also depends upon conditions. As many as eight can be kept busy with one mixing board in certain cases, but with more men than this, if there is much to be mixed, it is often better to set up another board.

We use long-handled, round-pointed shovels for mixing. Other kinds have been tried and many new men have started work with the statement that they prefer the square point short handle, yet, whenever the short shovel has been provided it has always been discarded for the long-handled tool after a few hours' work.

Long-handled, square-point shovels have also been tried, but the round point will pick up all the ordinary man can handle if he is going to work all day, though we always keep a square point handy for cleaning the last of the batch off the board.

Some little care is required in putting the mixture into the forms to insure a compact wall and smooth finish. One man watches this part of the work, and if necessary directs where the material is to be placed. He has a spade or a worn shovel, the blade of which has been flattened. With it he rams the mixture and keeps the larger stones from collecting on the face of the wall and forming what is known as "honeycomb."

Where the mixture is coarse and the wall thin, it is often difficult to make a smooth finish. In these cases the men placing the concrete should be directed to so turn their shovels that the backs of them come next to the face of the wall, because in a shovelful of mixed concrete most of the "fine stuff" is next the shovel blade.

Another cause of honeycomb comes from filling the form too high at one point and allowing the mixture to roll down the form. This does no harm if watched, but often the man doing the tamping overlooks this matter because he has already spaded the portion affected by the movement of the concrete.

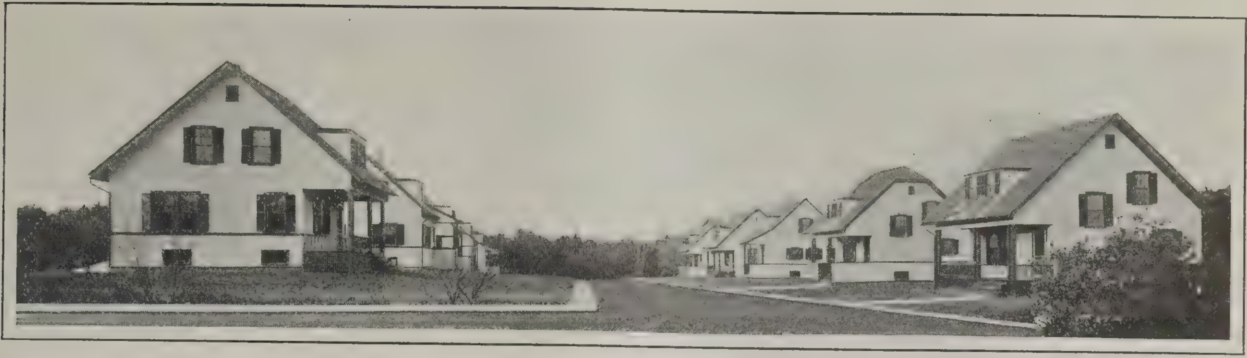
One phase of concrete work that has often received attention is the matter of having new work stick to old. It has even gone so far as patented preparations for applying to the surface of the old work to make the adhesion of the new work positive. The writer has never had any difficulty in joining new work to old and has never had to use anything but the material at hand.

First the surface of the old work should be roughened and, if possible, made irregular in outline. Much of the trouble is caused by the joint between the old and the new surfaces being in a straight line. This forms a weak spot in the wall, not because the concrete does not stick there as well as anywhere else, but because it provides for a continuous line of cleavage in one direction. Every stone mason and quarryman knows that solid rock will split easier *with* the grain than in any other direction, and these straight lines of junction form what we may term "grain" in the concrete.

After the surface has been roughened it should be swept clean of all lose particles. Water from a hose can be used for this cleaning process, but the very best thing of all, if it can be obtained, is air under pressure. The water sometimes washes mud into the crevices of the work, and nothing is worse for a joint between two concrete surfaces than a thin film of mud.

After the wall is cleaned off we wet it carefully and thoroughly and then mix a small batch of sand and cement mortar in the proportion of two of sand to one of cement. This mortar we trowel over the surface of the old concrete to a depth of ¾ in., and while soft deposit the new concrete on top of it.

The argument for this is that one can take two bricks, two pieces of rock or two cement blocks and stick them so thoroughly together with a sand and cement mortar that they may be broken to pieces before the joint will give way. In practice we have found that this statement also applies to old and new concrete, and have found this method of joining satisfactory and reliable under all conditions.

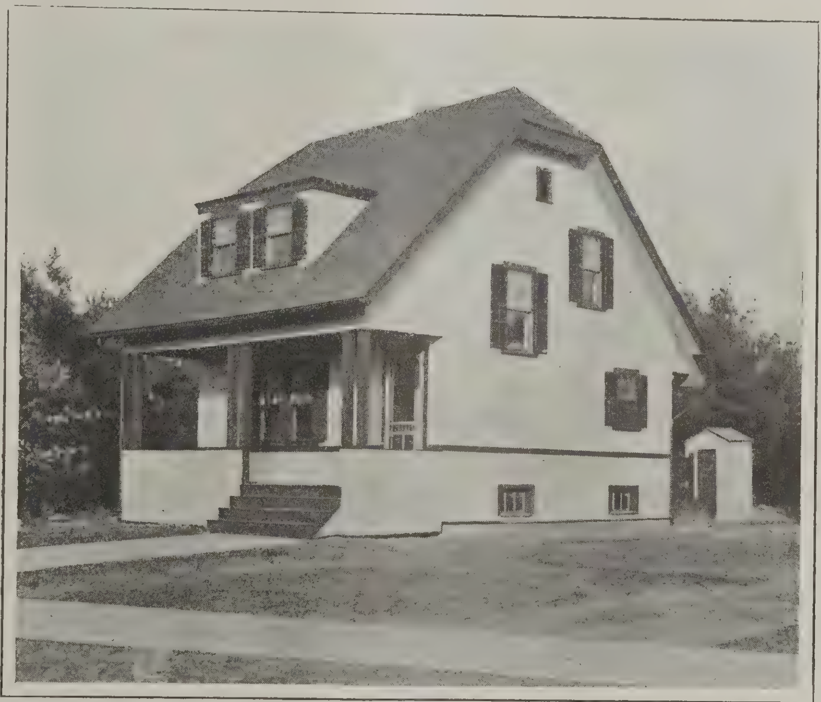


PART OF A GROUP OF 30 MODEL STUCCO COTTAGES BUILT FOR OCCUPANCY BY WORKINGMEN AT HANOVER, MASS.

Inexpensive Cottages for Workingmen

An Interior Arrangement Which Gives Three Rooms to a Floor—Details of Construction—Cost $1,485

THE present-day tendency of industrial concerns to provide convenient and comfortable housing accommodations for their workmen at a figure which bring them well within the means of the men is exemplified in the pictures given herewith which represent a portion of a group of 30 model stucco cottages recently erected at Hanover, Mass. The picture at the top of this page affords an excellent idea of the street architecture which prevails and the general layout of the houses along the thoroughfare. The small pictures represent two styles of exterior treatment, both cottages being based upon the same floor plans. The principal difference in the external architectural treatment is to be found in the "cut-off" at the gable ends of the roof.



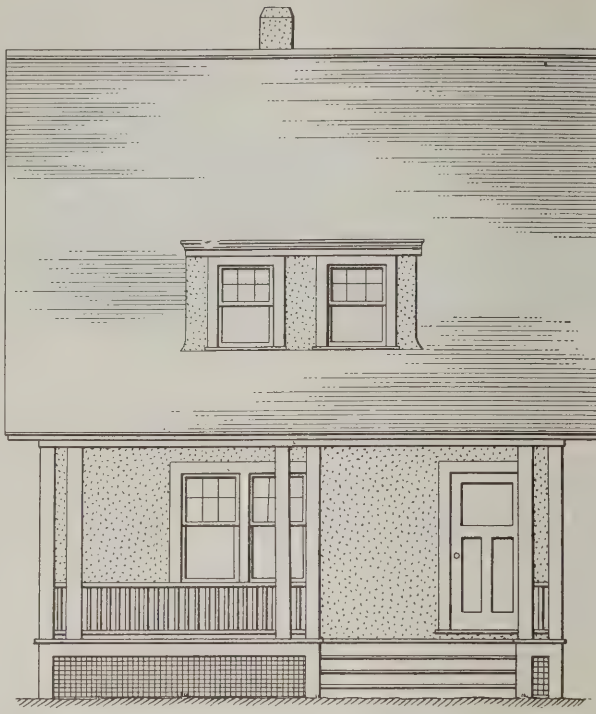
Photographic View of One of the Model Six-Room Cottages for Workingmen—W. F. Barlow, Jr., architect, Brockton, Mass.

An inspection of the plans shows the living room to extend practically across the front of the house, and opening from which, toward the rear, are the dining room and the kitchen. There is direct communication between the dining room and kitchen and from the latter lead the stairs to the cellar. Over this flight are the stairs leading to the three sleeping rooms which are found on the second floor.

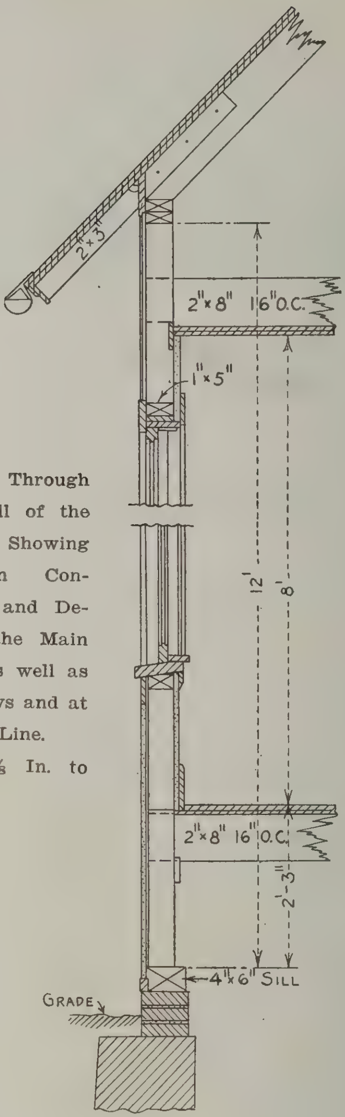
The foundation wall is of local field stone laid up dry. It is 4 ft. 9 in. high and measures 1 ft. 4 in. in thickness at the top and 2 ft. 4 in. at the bottom. On the inside the wall is neatly pointed with mortar. The top of the wall is leveled off with three courses of brick laid in lime mortar. The footings for the posts are flat stones 18 in. square set on a level with the cellar bottom.

All outside brick piers are laid up in cement mortar and the chimneys are of common hard-burned brick laid up in lime mortar to the roof. Above the roof the chimneys are laid in cement mortar.

The framing timber is of spruce, the sills being halved at the corners and the posts and girts mortised together and pinned. The sills and posts are 4 x 6 in.; the drop sills 6 x 8 in.; the piazza sills 4 x 6 in. and the plate 4 x 4 in. The floor joists are 2 x 8 in.; the outside and inside studs 2 x 4 and 2 x 3 in.; the ceiling joists 1 x 6 in.; the piazza floor and ceiling joists 2 x 6 in., all of which are placed 16 in. on centers. The rafters are 2 x 6 in. placed 24 in. on centers. The ledger boards are

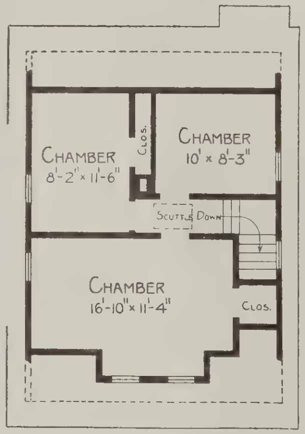


Front Elevation—Scale ⅛ In. to the Foot

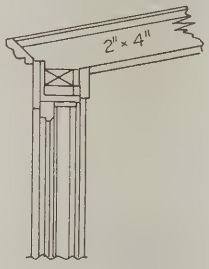


Section Through Main Wall of the House Showing Foundation Construction and Details of the Main Cornice as well as of Windows and at the Floor Line.

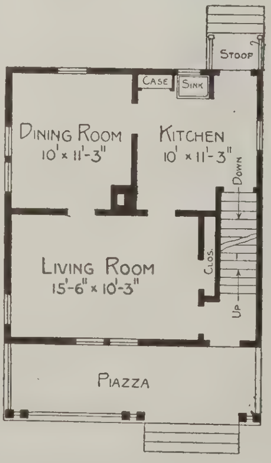
Scale ⅜ In. to the Foot.



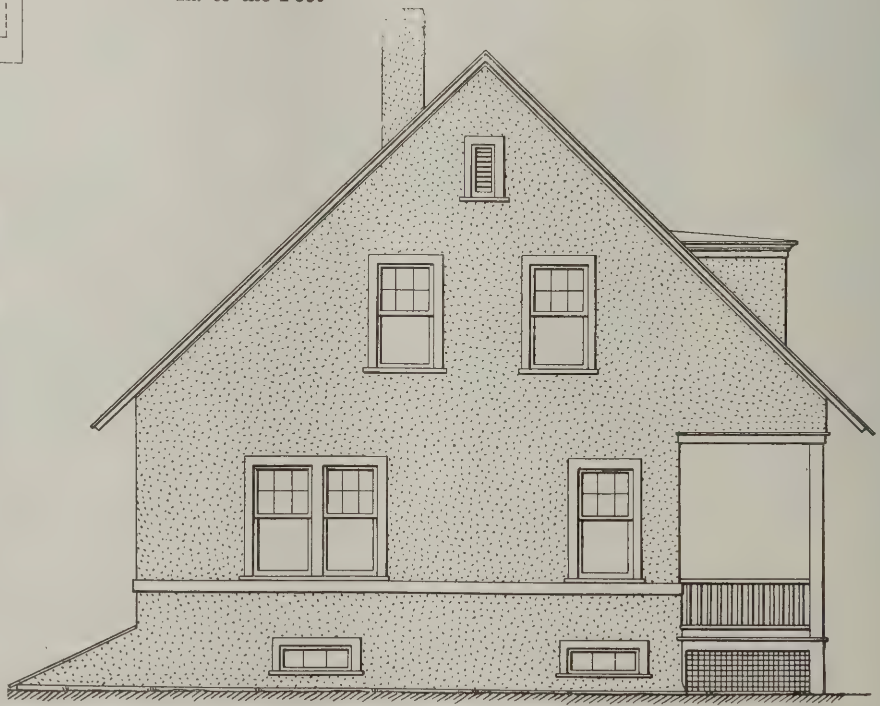
Second Floor



Detail of Dormer Window—Scale ½ In. to the Foot



First Floor
Scale 1/16 In. to the Foot



Side (Left) Elevation—Scale ⅛ In. to the Foot

Inexpensive Cottages for Workingmen—Elevations, Plans and Sections

1 x 4 in. nailed to the studs in the cellar and cut in at the second floor. The studs are doubled around opening and all spans over 5 ft. 6 in. are trussed.

The frame is well braced at the corners and intermediate posts with 2 x 4-in. braces from posts to sill and from sill to plate. Horizontal pieces are placed between the studding every 4 ft. in hight to serve for nailings for Bishopric Board. All outside walls are covered with Bishopric stucco board made by the Mastic Wall Board & Roofing Company, Cincinnati, O., and to which was applied two coats of cement plaster. The first coat consisted of lime mortar and hair mixed with Portland cement mortar made up of one part cement and three parts sand. The two mortars were mixed thoroughly together in the proportion of three parts lime mortar to one part cement mortar. The second coat consisted of cement mortar made up of one part cement to three parts sand mixed in semi-liquid state and slapped on with a wooden paddle.

The rafters are covered with hemlock sheathing board on which is laid Proslate roofing, hexagonal pattern, as made by Bird & Son, East Walpole, Mass.

The floors in the living room, dining room and kitchen are double with sheathing paper between, the sub-floor being No. 1 hemlock well nailed at every bearing, while the finish floor is a combination of maple, beech and birch and known as "Electric Flooring." The sleeping rooms in the second story have a single floor composed of ⅞-in. selected matched spruce.

The window frames are regular stock pattern with hard pine pulley stiles and parting strips, pulley wheels, cords and weights complete. The sash are 1½ in. thick with lights divided as shown in the pictures. The small lights are single thick glass and the large lights are double thick glass. The bath room window has Maze glass in the lower sash.

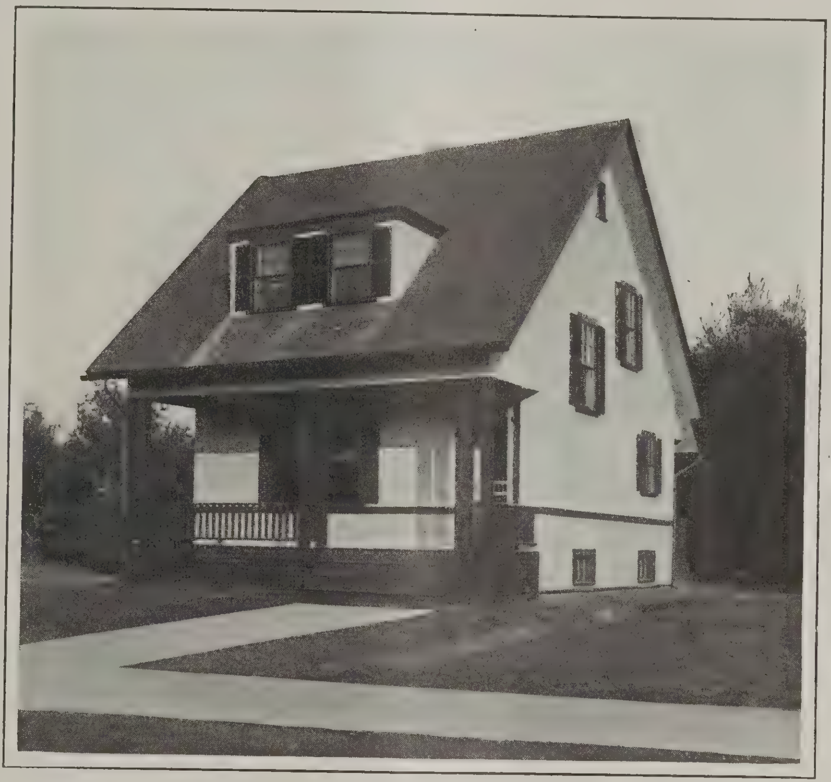
The outside doors have 1¾ rabbeted frames and the inside frames are 1½ in. rabbeted for 1⅝-in. doors. The inside doors are of fir and of the five cross-panel type. The outside doors are of pine.

All inside finish is North Carolina pine with plain ¾ x 5-in. casings and 1 x 5-in. square headers. All dadoes have a 3-in. plain cap and the 7-in. base has a beveled top.

The casement windows are hung at the sides to swing out and have 1⅜-in. hard pine frames. All double-hung windows are fitted with blinds.

The outside thresholds are of 2-in. hard pine with a pitch of 1 in. and the inside thresholds are of ¾-in. maple.

The rooms are lathed and plastered, the plastering being two-coat work. The plaster was made of Eastern lime, sharp bank sand and long washed cattle hair mixed in the proportion of one barrel of lime to three of sand and one bushel of hair. The second coat consisted of lime putty and clean washed sand; troweled to a smooth, hard surface. The kitchen, bath room and stairs have hard plaster dadoes 3 ft. 5 in. high. The under side of all overhangs as well as the piazza ceilings are covered with "Ceil Board" made by the Philip Carey Company, Cincinnati, Ohio.



Photographic View of Another of the Model Six-Room Cottages but Having the Same Floor Plan Arrangement as the Cottage Shown on the First Page of This Article

The kitchen is provided with a 36-in. iron sink separately trapped and supplied with hot and cold water.

The woodwork in the living room and dining room was treated to one coat of shellac and one coat of wax; while the woodwork in the kitchen, entry, pantry and bathroom had one coat of shellac and two coats of varnish. The woodwork in the sleeping rooms was painted two coats semi-flat finish. All floors had one coat of shellac and one coat of hard floor finish. The walls in the kitchen, entry, pantry and bathroom had one coat of glue size and two coats of paint.

All outside metal work was painted two coats, the first coat being red lead and oil. All the walls of the rooms on the second floor were given two coats of "Alabastine" made by the Alabastine Company, Grand Rapids, Mich.

The houses here illustrated constitute a portion of a group of 30 built for the E. H. Clapp Rubber Company, Hanover, Mass., the work being executed by James Shields, contractor and builder, Forest Avenue, Brockton, Mass.

The plans were prepared by Architect W. F. Barlow, Jr., with offices at 80 North Main Street, Brockton, Mass., and the cost of each house was given by him as $1,485, which amount included architectural services.

Concrete Tile House of Stucco Finish

The Light Gray Stucco Walls Form a Pleasing Contrast With the Imitation Spanish Tile Covering of the Roof

THE country house which forms the basis of our colored supplemental plate this month embodies a number of interesting features both as regards exterior treatment and interior arrangement. Care has been taken to utilize every available foot of space and the house outline being particularly square, gives it a shape that is economical of construction. A feature of the interior arrangement is the central hall from which rise the main stairs. At the left is the living room and beyond a "study" or library according to preference. At the right of the main hall is the dining room and beyond this a commodious pantry.

The kitchen is located directly in the rear of the main stairs and hall, the cellar stairs being placed directly under the main flight. The relation of the pantry between kitchen and dining room with its two double acting doors tends to keep cooking odors from penetrating the dining room. The second floor shows four sleeping rooms, a sewing room and in the rear a bath room, which, being directly over the kitchen, tends to concentrate the plumbing fixtures.

The foundation walls are of concrete 12 in. thick with a footing course projecting 8 in. on both sides. The concrete consists of a mixture of one part Portland cement, two parts sharp sand and five parts broken stone, no piece measuring more than 3 in. in its largest dimension. The walls of the superstructure are of concrete tile blocks laid up in cement mortar, the wall surfaces waterproofed and finished with two coats of light gray stucco.

The roof beams are 2 x 8-in. spruce and covered with ⅞ x 6-in. tongued and grooved hemlock boards. These carry a heavy layer of building paper which in turn is covered with imitation tile tin shingles, lap jointed and well fastened to the sheathing.

The floor beams are 3 x 10-in. spruce placed 16 in. on centers and stiffened every 15 ft. with heavy herringbone bridging. The studs are 2 x 4 in. also placed 16 in. on centers.

The interior surfaces of the tile walls are furred out to receive the lath to which three-coat plaster work is applied. This gives an air space back of the plaster. The rooms of the first floor have sand finish and the same is true of the rooms on the second floor with the exception of the closets.

The rooms throughout the house have complete trim and base of cypress. The flooring is of maple except in the kitchen and pantry where it is Georgia pine. All sash are of white pine, double hung with the Samson spot sash cord made by Samson Cordage Works, Boston, Mass. The entrance door, 2 in. thick, is of veneered oak on a white pine core.

The house is piped for gas and wired for electric lighting. There is an outlet in the front porch roof for an electric globe, also an outlet at the foot of the cellar stairs. The fixtures are of the combination type.

The house is intended to be heated by steam of sufficient capacity to give a temperature of 70 deg. F. when it is zero outside.

The bath room has a floor of square white tile resting on a bed of cinder concrete. The plumbing fixtures include an enameled roll rim tub, wash basin and closet, placed as indicated on the plan.

The porch is laid with square red tiling finished with neatly struck joints.

The gutters and leaders are of galvanized iron painted both sides with leader heads and supports for the gutters.

The imitation Spanish tile tin shingles were treated to two coats of Prince's metallic paint with leaders and gutters of a reddish brown.

All exterior trim and woodwork received three coats of paint while the interior woodwork had two coats of varnish.

Cubic Contents of House

The approximate cubic contents and cost of the house is as follows:

House 28 x 40 x 24 ft. high equals	26,880 cu. ft.
Porch 9 x 18 x 10 ft. high equals	1,620 cu. ft.
Cellar 20 x 24 x 5 ft. high equals	2,400 cu. ft.
	30,900 cu. ft.

At a unit price of 18 cents per cubic foot this makes the cost approximately $5,562.

Estimate of Cost of Labor and Materials

Excavating	$60.00
Grading	45.00
Masonry	1,590.00
Cement, concrete, etc	803.00
Plastering	319.00
Mill work and carpentry	1,335.00
Painting	160.00
Heating	305.00
Plumbing	355.00
Mantels	40.00
Metal work, tilling, etc	340.00
Gas and electric work	160.00
Hardware	50.00
	$5,562.00

The plans and specifications of this house were prepared by Frank T. Fellner, architect, care *The Building Age*, 239 West 39th Street, New York City, or 413 Caton Avenue, Brooklyn, N. Y.

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Something more than 1000 builders are said to have been licensed in Boston, Mass., in anticipation of the new building law that went into effect the 1st of April.

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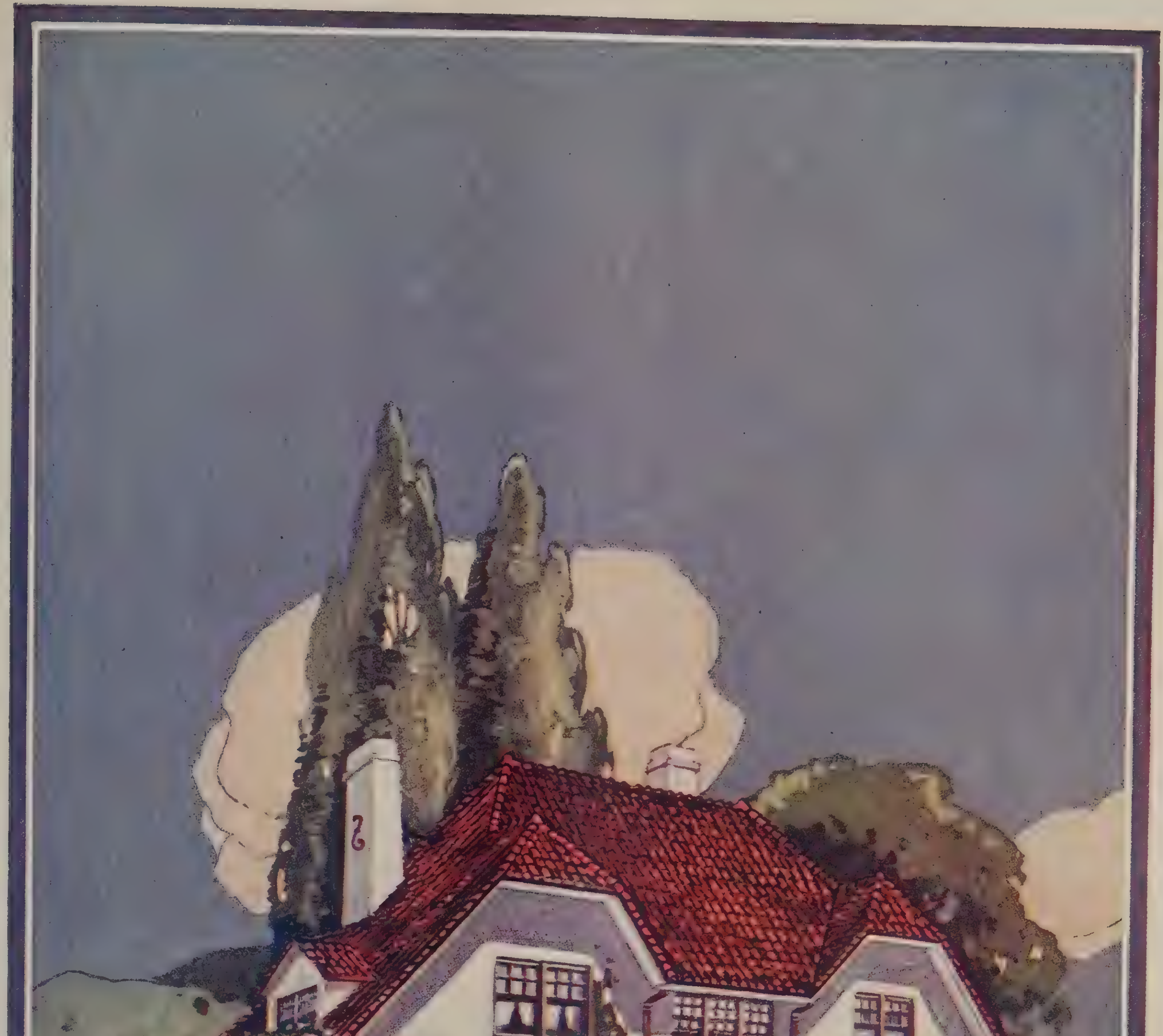
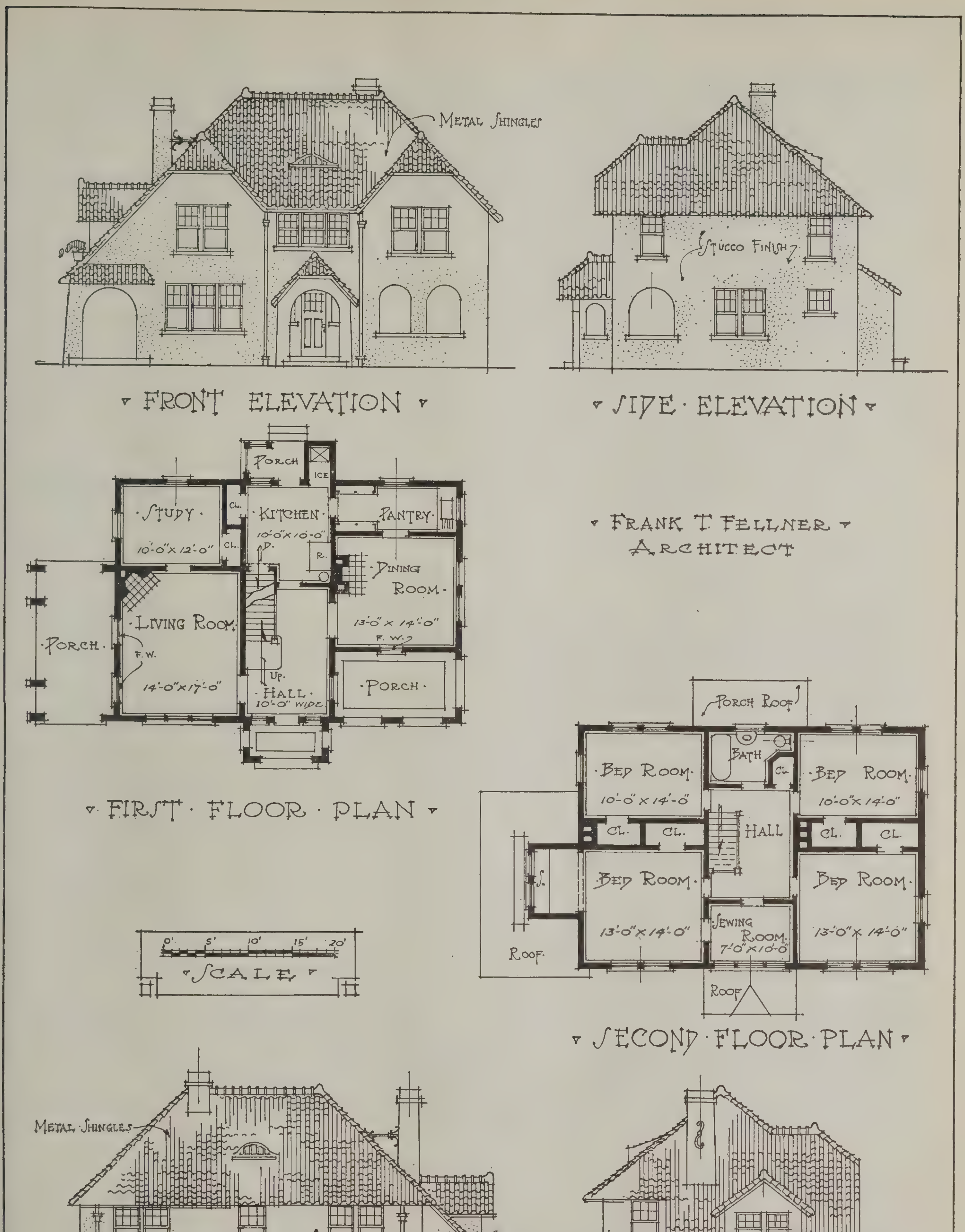
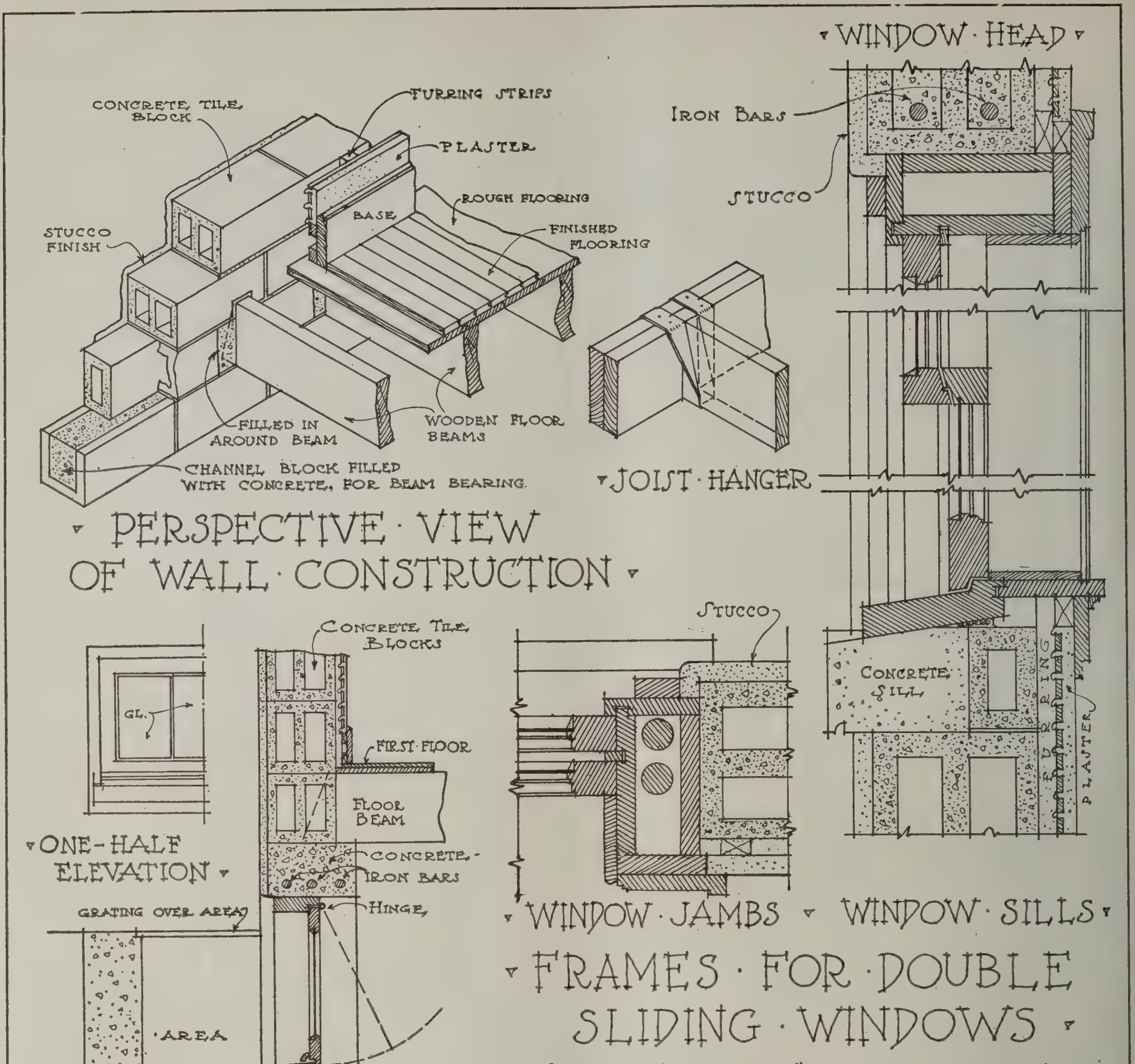
Kingston, Ont., is about erecting a five-story fireproof hotel to cost $200,000.



BUILDING AGE
NEW-YORK



Concrete Tile House of Stucco Finish—Plans and Elevations Relating to the Colored Supplemental Plate



Concrete Tile House of Stucco Finish—Details Relating to This Month's Colored Supplemental Plate

The Development of Skilled Mechanics

Need of Better Workmen in Many Branches of Trade —How Greater Efficiency May Be Brought About

By R. A. Wagner

INDUSTRIAL education is rapidly becoming recognized as one of the potent factors in the trades development of this country. When one takes a retrospective view of the origin and development of trade schools, the influence they have exerted in the trades and the social development of the tradesman, we cannot fail to recognize the immense amount of good already accomplished and the tremendous possibilities of the future. Industrial education is in its infancy, but the movement is advancing with such strides that in future it will outrival our present institutions for preparation in professional vocations.

Trade education is becoming more and more universally recognized as the likely successor to the apprenticeship system. While it is not meant to imply that the apprenticeship system has not to some extent at least been a success in years gone by, yet we must not fail to recognize the fact that the class of work to-day is not the same as that of generations since. The growing demand has created a surplus of deficient mechanics and there is urgent need of such reforms as will replace them with those who are competent to perform the work which they are called upon to execute.

The development of the country along trade lines demands a more thorough and efficient system than the haphazard methods used in instructing the young apprentice. The trade school seems to satisfy this demand in every respect. Speaking of this subject, President Eliot of Harvard University says: "The apprentice system has been in past centuries, and still is to some extent, an unjust and imperfect method. It is a slow and wasteful method of learning a trade and liable to great abuses. Any bright and diligent youth can learn a great deal more in three years at a good trade school than in seven years' apprenticeship."

Should the apprentice, in spite of the fact that he is almost invariably given the work of an ordinary laborer, yet retain interest enough to strive to learn, he receives little or no encouragement. He receives no competent instructions as to the proper use and care of tools; his knowledge of working drawings is meager at the most and if at the end of his indenture he is able to command full journeyman's wages he is an indifferent mechanic, with no ambition and little interest in his trade.

In the opinion of those who have given the subject much study and deep thought, the trade school is the best solution of the problem of creating a greater number of skilled mechanics. Trade education being as it were in a state of experiment many mistakes are made and many incorrect prin-

The Development of Skilled Mechanics—Carpenters and Bricklayers at Work Building a Piggery ciples put into practice as to the proper application of trade instruction.

Whereas, in the old system the apprentice received much practice with little or no theory, he is liable to meet the other extreme in the trade school. The prime underlying principles of the trade, the proper instruction as to the care and use of tools, careful attention to details, a full knowledge of working drawings, intelligent instruction in the constructive and mechanical details of the trade, and the proper amount of theory to use with practice—these are important points that cannot be overlooked in the successful education of the trade school apprentice.

Another very important factor is the elimination of anything tending toward commercialism. In some of the trade schools it is the common practice to take contracts in the production of some staple article. This is frequently done to defray the expenses of the less firmly established trade school. This method would not arouse the interest of the apprentice as it should and so the primary object of the trade school would be defeated. It would also tend to fit the apprentice for engaging in piecework—a practice which is followed quite extensively—but to say the least, does not tend to produce an all-around mechanic.

What industrial education has been doing to better the conditions of the building trades is not so generally felt as yet. The country is too large and the members of these trades are too transient for any marked improvement in any one place.

The trade school does not receive the encouragement it should, considering the great practical value to the country. That conditions are changing for the better, however gradual, are clearly discernible, and before many years there is no doubt that trade education will become more general.

Among notable examples of successful trade schools to-day mention may be made of the Williamson School, founded 26 years ago by one who recognized even then the coming need of this country for better educated and more skilled mechanics. The fact that the school to-day is conducted along practically the same lines as when founded, and that the principles as laid down by the founder are in accord with present-day ideas of trade education are ample proof of his far-seeing sagacity.

While situated but a short distance from Philadelphia, and sending forth each year a class of from 40 to 70 young journeymen carpenters, bricklayers, pattern makers, machinists and engineers, the school is not widely known, and brief reference to the methods there in vogue may not be without interest in this connection. The successful applicants are indentured for a period of three years, for the first two of which the time in the classroom and shop is evenly divided. During the last year the time in the shop is increased so that at the end of his third year the apprentice is working full journeyman's hours. The classroom work consists of a good practical English education, and with the exception of the languages, the curriculum is about the same as our high schools. In addition the strength of materials, electricity, steam and a good course in mechanical and architectural drawing are taught—the work in the drafting room corresponding to the work in the shops. The young apprentice is taught: Fundamental principles of his particular trade, the proper

The Development of Skilled Mechanics—Carpenters at Work on a New Dormitory at Williamson, Pa.

use and care of tools, how to draft correct working drawings and construct from them, constructive and mechanical details with estimating in actual construction work.

Throughout the entire course the point of theory in practice is not overlooked. The carpenters and bricklayers use the science of geometry and mensuration. The machinists are familiar with trigonometry and so on. During the greater part of the course the apprentices of the building trades engage in the construction of the school buildings. The work on these is done in the same manner as on jobs in the cities. Competent instructors constantly direct and give the apprentice personal attention in the many details of his work, for the instructors are practical men well informed in the many points of their various trades.

A unique and successful system has been inaugurated at this school called "The Bonus System." It is founded on the estimated time based on a full journeyman's time. For the first six months of his second year the apprentice is given 20 per cent. more time to complete his work than the journeyman's time; for the last six months of his second year this is reduced to 10 per cent. The first six months of his third year a further reduction to 5 per cent. is made and the remaining six months of his stay at the school he works on the same level as a full-fledged journeyman. For any better results the apprentice is given a bonus or merit, and for any deficiency a corresponding demerit. The general results of trade education as here taught are most gratifying and the success of the graduates is in nearly all cases very good. While it is not the primary object of the school to produce foremen and contractors, yet returns show that a large number of the graduates in a very short time reach executive positions of great responsibility.

The ultimate future of the development of the building trades depends upon the increased promotion of the trade school. In this the public school plays a very important part. As the trade school increases it expands and embraces the public school. A large percentage of the youth of to-day leave school at a very early age. When the trade school will have in part taken over the public school then will a greater interest be shown. As it is today, however, thousands leave our public schools with no special training for any one trade or profession. The result is a large over-stocking of the market with unskilled labor. In this age of centralization and specialization this state of affairs cannot long exist. Quoting from a leading promoter of industrial education: "When employers and parents generally learn the splendid possibilities of trade training in thoroughly organized and carefully administered trade schools, there will arise a great demand from them for such institutions. These schools will so dignify handicrafts that the parents of the future will consider them in a class with the colleges and technical schools when deciding what training to give their children."

Courtesy of the "Manual Training Magazine"

Development of Skilled Mechanics—Group of Fifth Grade Boys, Newman Manual Training School, New Orleans, Building a Greenhouse

The general attitude of employers toward the trade school is gradually changing. Heretofore a large amount of prejudice has been shown, and it has frequently been difficult for the graduate to obtain a position if he made it known that he was a graduate of a trade school. This was especially true in the building trades, but the fact that the trade school graduate has "made good" and the remarkable improvement shown over the ordinary apprentice has done much toward receiving for him a fair chance to prove his ability. It should be the part of every employer and workman to give the trade school boy a fair show. He does not know it all and sensibly realizes the fact. Graduates of colleges, technical schools and other vocational institutions continue to learn long after they leave their alma mater. Men old in years who have faced many problems and obstacles will admit that they only began to learn the real lessons of life after leaving school. The trade school graduate is no exception, and if treated fairly will acquit himself with credit.

In the opinion of the writer the only possible way the ever-increasing demands for skilled mechanics can be met is by promoting the establishment of trade schools everywhere. The superior training given and the latent ability developed make of the trade school apprentice a mechanic in the fullest extent of the word. It is the belief that when there are more trade schools there will be fewer strikes. Whether this is as sound in practice as in theory remains for the future to determine. Should it, however, be but one of the many results of the establishment of trade schools, this country would be spared millions of needless gwaste and the effects upon the trades could not help but be good. In this day efficiency is the ever-growing cry in all professions and trades. As the prime object of the trade school is efficiency, it would follow that nothing could be of more lasting and valuable benefit to the building and other trades than the intelligent promotion and friendly co-operation of every tradesman in industrial education.

Courtesy of the "Manual Training Magazine"

Development of Skilled Mechanics—Work of First-Year High School Students at Atlantic City, N. J.

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Screening Toilet Room Windows

With so much being done to prevent the spread of disease by the house fly, the suggestion of screens for toilet room windows is worthy of consideration. In the discussion on the open air schools at the Fourth International Congress on School Hygiene at Buffalo recently a recommendation was made that all toilet windows in such schools should be screened to prevent the passage in and out of the house fly. There is merit in this suggestion, and the screening of toilet rooms should by no means be confined to the open air school. The school of the regulation type is equally important, and this precaution should be taken with its toilet rooms. So also should the home owner guard his health and that of his family. In fact, the suggestion may be followed universally, and wherever the house fly exists the authorities should formulate regulations to make such screening obligatory.

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Steam Pipes Embedded in Concrete

The incident related in the following account of trouble with a heating system, as described by a correspondent, offers an opportunity for speculation.

In the county court house in the town in which I live two fireproof vaults had been built. The building is heated by a vacuum system. The contractor in putting in the vaults did not change the heating pipes to the second floor, but cemented them in the solid wall, which extended about 20 ft. from the basement to the second floor. The three radiators on the upper floor failed to heat.

I made an investigation and found the pipes embedded in the concrete, and as stated in the foregoing, with no insulation around them. My idea was that a great amount of the concrete wall would have to be heated by the pipes before any heat could reach the radiators. All the vapor would be condensed before the heat could reach the radiators. We could not wait to see if the time would ever come when the vapor would reach the radiators, for the court room was to be used in a few days and it had been about two weeks since the job had been completed and the heat had been kept going all the time. I made a change, running new risers, and used the same returns as before. The radiators heated satisfactorily after that had been done. It would be interesting to know if when the wall was thoroughly dry, the concrete would absorb sufficient heat to affect the supply of vapor to the radiators.

Drawing Windows of Gothic Design

Some Suggestions for Laying Out Complicated Window Tracery in the Gothic Style of Architecture

By Alfred Auslander

A SHORT time ago there appeared in the columns of the paper a request by a correspondent in Oregon for an article or two on drawing in the Gothic style, relating more particularly to complicated window tracery and the method of finding the centers. At the outset it is interesting to note that a window may be said to be Gothic when in its design it has the elements that were characteristic of a period or style in architecture known as Gothic.

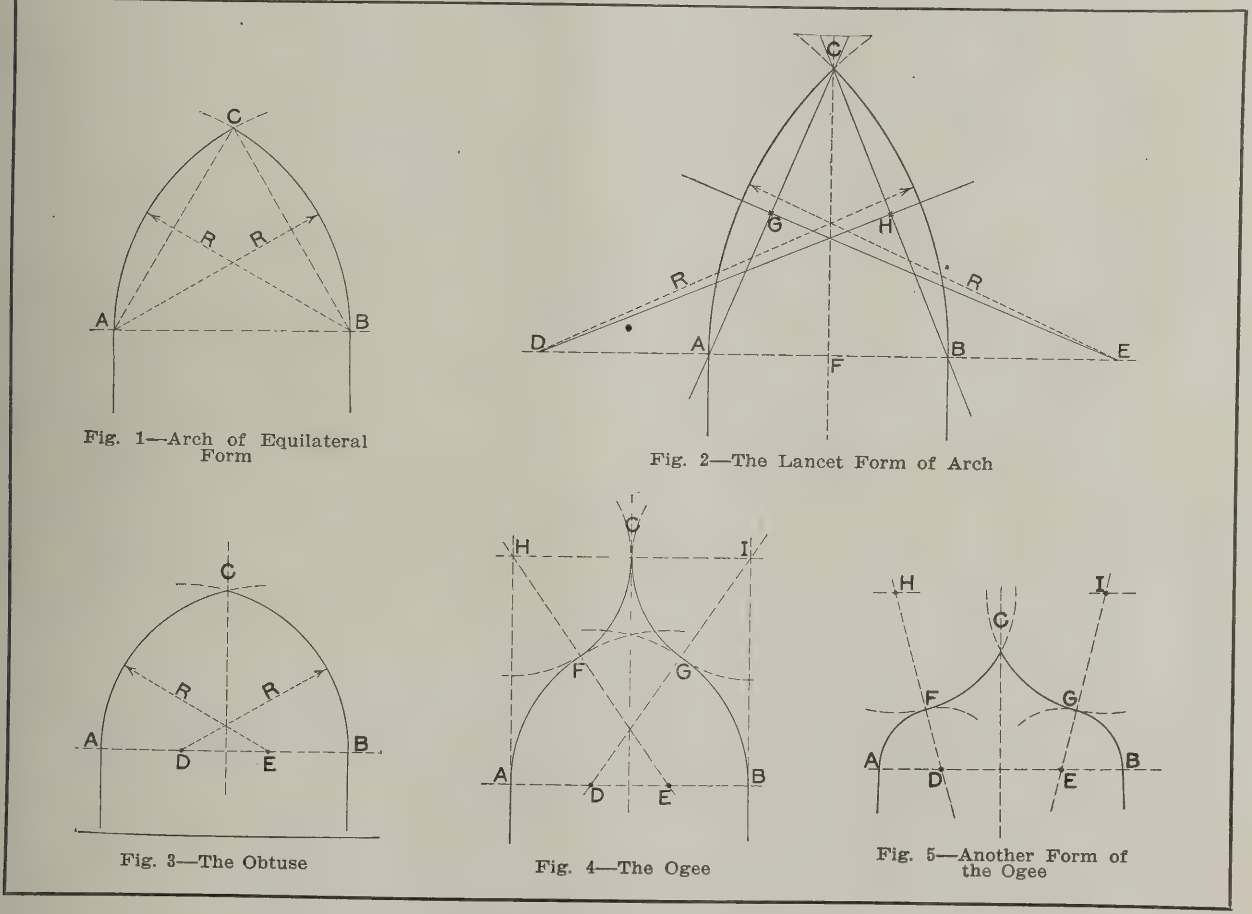


Fig. 1—Arch of Equilateral Form

Fig. 2—The Lancet Form of Arch

Fig. 3—The Obtuse

Fig. 4—The Ogee

Fig. 5—Another Form of the Ogee

Drawing Windows of Gothic Design—By Alfred Auslander

This style developed in Western Europe about the middle of the twelfth century and lasted until the end of the fifteenth. The term Gothic was originally used in a spirit of contempt to distinguish works that it was supposed could only have been produced by such barbarians as the old Goths. And though the name is thus without descriptive significance in itself, such is the force of habit, it has become too familiar and fixed by long usage to be abandoned. Although there are several structural principles that underly and distinguish the Gothic style, the one that is commonly regarded as most characteristic is the systematic use of the pointed arch. Although the pointed arch had been used before, it was only in a casual and decorative way. In the Gothic period the importance of the pointed arch from a constructive point of view was first recognized and its use as an essential feature became almost universal.

It was used in all kinds of buildings but most extensively in religious edifices, and attained its most complete development in the great cathedrals of England, France, Germany, Spain and the Low Countries. For this reason it is often thought of as a distinctly ecclesiastical style. The style varied somewhat in the different countries, and also in its different stages of development, so that there are naturally such terms as Early English Gothic, Late French, etc.

The window shown on the full page drawing is from the French Cathedral in the town of Amiens. Before entering upon a description of how such a window is designed and drawn, it will be more logical to consider some of the forms of the pointed arch which are frequently used in Gothic windows.

The pointed arch is formed by the intersection of the arcs of two circles at the top point or crown of the arch. It is a two-centered arch, and there are three simple forms resulting from the varying length of the radius for the intersecting arcs.

The form shown in Fig. 1 is known as the *equilateral* from the fact that its extremities are also those of an equilateral triangle, that is, one whose three sides are of equal length. Thus on *A-B* a horizontal line let *A-B* equal the width or span of the proposed arch opening. Then from *A* as a center with a radius *R* equal to *A-B* describe the arc *B-C*, and likewise from *B* as a center with equal radius describe the arc *A-C* intersecting the arc *B-C* at *C* and giving the pointed arch *A-B-C*. Its extremities, *A-B-C*, are also the points of an equilateral triangle *A-B-C*. In this form the length of the radius is equal to the arch opening *A-B*. The line *A-B* is called the springing line of the arch.

The form shown in Fig. 2 is known as the *Lancet* from the resemblance it bears to the sharp pointed head of the surgical instrument of this name. In this form the radius is longer than the width of the arch opening. So to draw a lancet arch with an opening *A-B*, a center *D* on the springing line *A-B* should be taken outside of the arch opening and then from *D* as a center describe the arc *B-C* with radius *R* equal to *D-B*. The other center, *E*, is fixed at the same distance outside the arch opening that center *D* is by making *B-E* equal to *A-D*. Then from center *E* with radius *R* equal to *E-A* (which is equal to *D-B* the radius of the first arc *B-C*) draw the second arc *A-C* intersecting at *C*.

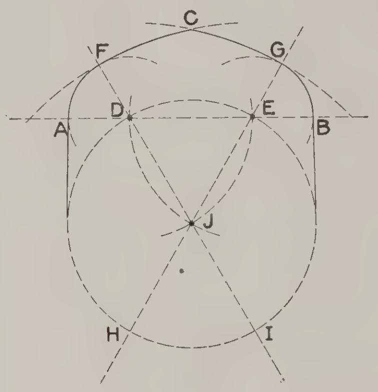


Fig. 6—The Tudor Arch

Drawing Windows of Gothic Design

A variation of this problem would be to draw, not as above *any* lancet arch having an opening equal to *A-B* but a particular lancet arch having the opening *A-B* and a fixed height equal to that of a given point *C* above the springing line *A-B*.

To find exactly where on the line *A-B* the centers *D* and *E* must be located in order that the arcs shall pass through the given point *C*, draw the straight lines *A-C* and *B-C* and erect perpendiculars to these lines at the points *G* and *H* taken half way between *C* and *A* and *C* and *B*. Where these perpendiculars *G-E* and *H-D* intersect *A-B* will be the centers *D* and *E* as required. From *D* and *E* as centers and with radii equal to *E-A* and *D-B* describe the arcs *A-C* and *B-C* which will intersect at given point *C*.

The form shown in Fig. 3 is known as the Obtuse. In this the two centers are located inside the arch opening and the radii are shorter than the width of the opening. On the springing line *A-B* locate the centers *D* and *E* equi-distant from *A* and *B* and inside the arch opening *A-B*. Then with radii equal to *E-A* and *D-B* describe the arcs *A-C* and *B-C* intersecting at *C*. If the point *C* is fixed then proceed as described for the lancet form to go through a fixed point *C* by erecting perpendiculars to straight lines connecting *C* to *A* and *B* at their middle points.

In addition to these three simple forms of the pointed arch having two centers, there are other forms more complex, making use of four centers. Thus in Figs. 5 and 6 are shown forms of the Ogee or Ogival, in which the intersecting arcs are double curved lines, first convex and then concave, being composed of the arcs of tangent circles. In the Ogee arch there are two centers on the springing line and two above.

Thus in Fig. 4 we locate two centers *D* and *E* on the line A-B, and describe the arcs *A-F* and *B-G*, with radii equal to *E-A* and *D-B*. Then two arcs, *F-C* and *G-C*, must be described such that they will be tangent to the first two arcs at two points such as *F* and *G*, and also touch or intersect at some point *C* on the central vertical line, giving the Ogee arch *A-B-C*.

In this particular case the upper two arcs are drawn to be tangent to each other at *C*, with radii *H-C* and *I-C* equal to half *A-B*, so that their centers, *H* and *I* are on vertical lines, *A-H* and *B-I*. These radii, *H-C* and *I-C*, are shorter than the radii *E-A* and *D-B* of the two lower arcs, *A-F* and *B-G*, and we get a lancet type of window.

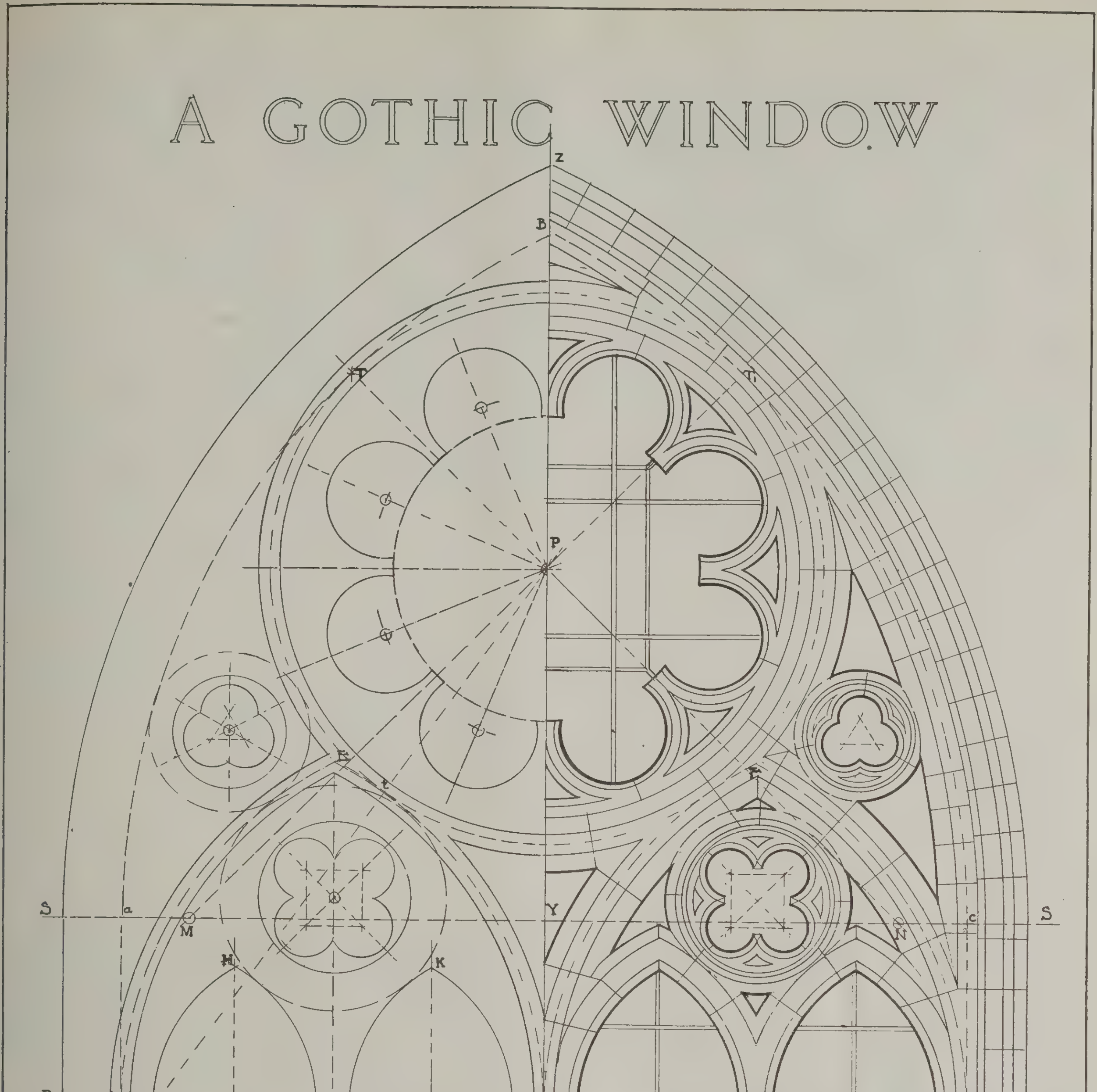
In Fig. 5 the radii of the upper arcs are, on the contrary, made longer than those of the lower arcs, and we have a form more like the obtuse.

Thus in *A-B* from centers *D* and *E* describe the arcs, *A-F* and *B-G*, with equal radii, *D-A* and *B-E*. From centers *H* and *I*, with equal, *H-F* and *I-G*, describe the arcs *F-C* and *G-C* such that they will intersect as at *C* and be tangent to the two lower arcs, as at points *F* and *G*, and form thus the flat ogee arch, *A-B-C*.

In Fig. 6 is shown what is known as a Tudor arch, in which the two curves of the arcs are convex, and two of the centers are below the springing line, instead of above it as in the Ogee.

On *A-B* locate *D* and *E* as centers equi-distant from *A* and *B*, and describe the arcs *A-F* and *B-G* with equal radii *D-A* and *E-B*. To find the centers *H* and *I* proceed as follows: From *D* and *E* as centers, with radii equal to *D-E*, describe the arcs *E-J* and *D-J* intersecting at *J* on a central line *C-J* from *J* as center and radius *J-D* describe circle intersecting *D-J* and *E-J* prolonged in points *H* and *I*. This makes *J-I* and *J-H* equal to *D-J* or *D-E*. From *H* and *I* as centers with equal radii *H-G* and *I-F*, describe the arcs *G-C* and *F-C* intersecting at *C* and giving the Tudor arch, *A-B-C*. It will be noted that the circle of which *F-C* is an arc is tangent to the circle of which *A-F* is an arc. Tangent circles have their centers on a common diameter.

(*To be continued*)



Drawing Windows of Gothic Design—An Interesting Example—By Alfred Auslander

A Unique Abode—Four Rooms in One

Novel Solution of Problem of Living Which a Cincinnati Bachelor Has Worked Out in a Practical Way

AMONG the many interesting solutions of the problem of living in a practical way one of the most unique is that which a wealthy old bachelor in Cincinnati has worked out for himself and which has given him an apartment combining four rooms in one. He has occupied this curious abode for the last five years and is decidedly of the opinion that it is the only way people should live who prefer life in an apartment, but that in the future many such four-rooms-in-one flats are likely to be built in the larger cities of the country where ground space is at a premium.

Size of the Room

The one room measures 16 ft. in length by 12 ft. in width and can readily be converted into a kitchen, a dining room, a living room and a bedroom, besides a library and bath room, which the occupant does not count. Each of these rooms is the size of the one described, for when the occupant desires to pass from his kitchen into his dining room he closes the sliding doors of the kitchen and opens up those concealing the dining room. After eating his meal if he desires to read the evening papers in the sitting room, he clears off the dining room table, folds it back into its wall space, slides out a few mirrored doors and the sitting room has been created. The bedroom is concealed in the other wall behind sliding doors and consists of a large double bed, a dresser, two chairs and a small table. Another sliding door on the same side of the room conceals a bath room, thus giving the occupant all the comforts of a home within the compass of a single room, and which has all that are usually found in a flat consisting of four rooms and bath.

In the illustrations on the facing page we show interior views of this unique four-in-one-room apartment, the upper picture indicating the bedroom arrangement, while the lower one shows the room converted into a dining room with kitchen features at the right and the sink at the left.

The Sanitary Aspects

Some may say that the four-in-one-room flat is unsanitary and that it is unhealthy to eat, sleep and live in a single room. This feature, however, has been given careful attention on the part of E. J. Beall, the designer, who is an advocate of fresh air and believes in sleeping with the windows wide open. In order to provide plenty of fresh air in his home he has arranged a system of electric fans which, drawing their fresh air supply from the outside, are so arranged in different parts of the room that the air is completely changed every two minutes. The point is made that the odors from cooking never permeate the dining room, nor does the tobacco smoke of his friends' cigars gathered around the table in the sitting room for a pleasant evening, get into his bedroom. Every morning the large soft bed is thoroughly aired, for accomplishing which the bed clothing is removed and placed about the room and the fans allowed to operate full speed for 20 minutes. At the end of that time the bed is ready to be folded back into its wall space.

In commenting upon this unique living apartment, Mr. Beall recently said: "This is the twentieth century way of living. I was a carpenter once upon a time and I figured it out long ago that this is the way flats will be built in New York, Chicago and other large cities some time in the near future. It is foolish to think one must have a separate room for a kitchen, a bedroom, a dining room and a sitting room. Most families need all these rooms, but why not have them all in one big room in one-quarter the space. It is really a four-in-one-room furnished flat in a 12 x 16 ft. room."

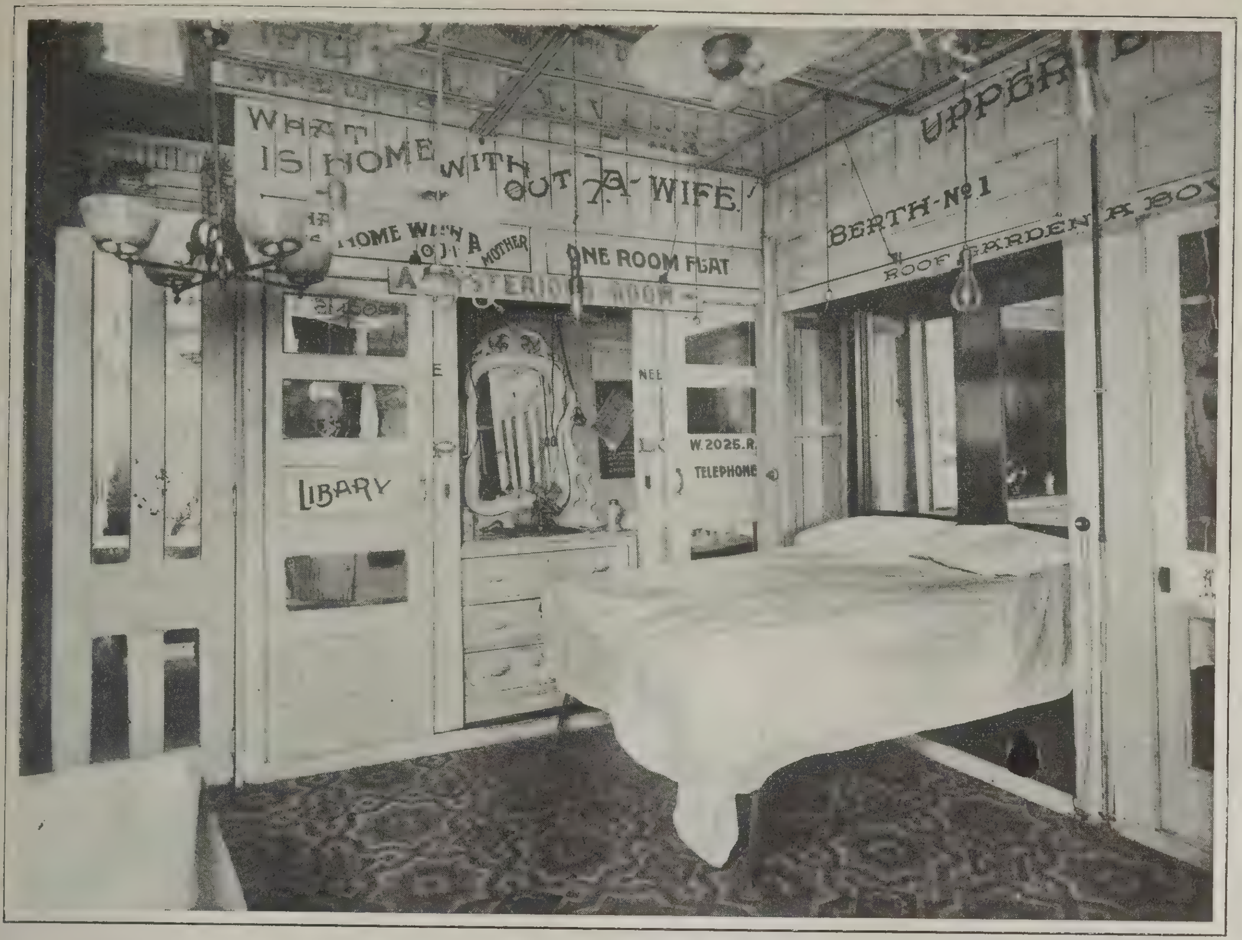
The Finish of the Apartment

To add to the cheerfulness and cleanliness of the home, the apartment is finished throughout in white enamel. Many mirrors are used in the panels of the sliding doors and even in the ceiling which makes the room look much larger than it really is. The four-in-one-room flat is lighted with electricity and gas, and there are four electric fans, also burglar alarm on the doors and windows. Mr. Beall is anxious that others learn of his novel home and he cheerfully welcomes all visitors, spending much time in explaining the various details. One of the many mottoes he has painted upon the walls or sliding doors, as perhaps they may more accurately be termed, is intended especially for the visitor, for it bids him "Welcome! call again."

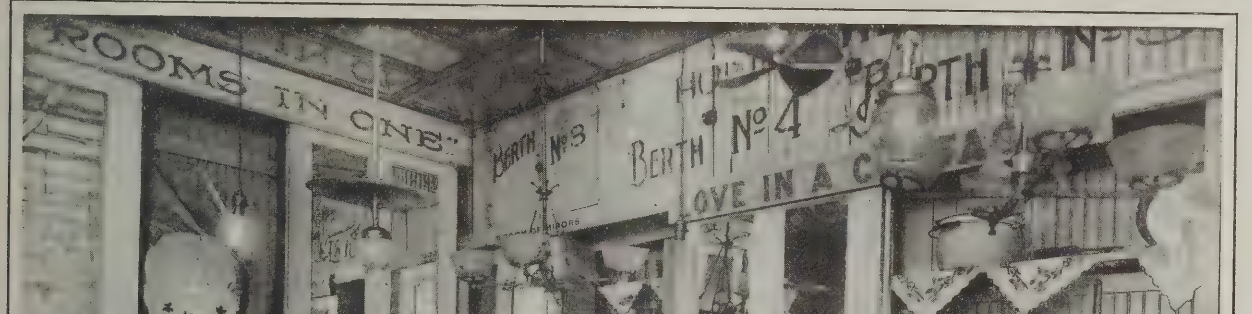
◆

Pressure Exerted by Water-Soaked Wood

The great pressure exerted by the expansion of wood when soaked with water has been illustrated during the flood at Dayton, Ohio. A quantity of oak dashes veneered with maple were stacked to within 1 in. of a reinforced-concrete girder in the basement of the factory of the Maxwell Motor Car Co. This girder had a cross-section of 12 x 19 in. and supported a 6-in. reinforced-concrete floor. The basement was flooded, and after the water receded it was found that the girder, together with the concrete floor which it supported, had been lifted 3 in. Ten weeks after the flood the girder still rested on the dashes, but it had settled about ¾ in. Large cracks developed in this girder, starting at the edge of the pile of dashes and extending upward and outward. These cracks extended from the bottom to the top of the section at an angle of about 30 degrees with the horizontal. It was necessary to replace this girder and a section of the floor.



The Shifting of the Various Doors Transforms the Sitting Room Into a Sleeping Room



A Unique Abode—Four Rooms in One—Showing Arrangement of the Interior When Used as a Dining Room

Some Types of Old English Cottages

Examples of Primitive Timber Framing — Several Aspects of the Cottage Problem as It Exists in England

THE old country cottage so dear to us all, with its thatched or tiled roof, overhanging eaves, mossy timbers, and lichen-covered walls, is one of the few remaining links with rural England of the past. Here and there even to-day may be found cottages which date from the time when habitations of this sort were first built, some time in the fourteenth century.

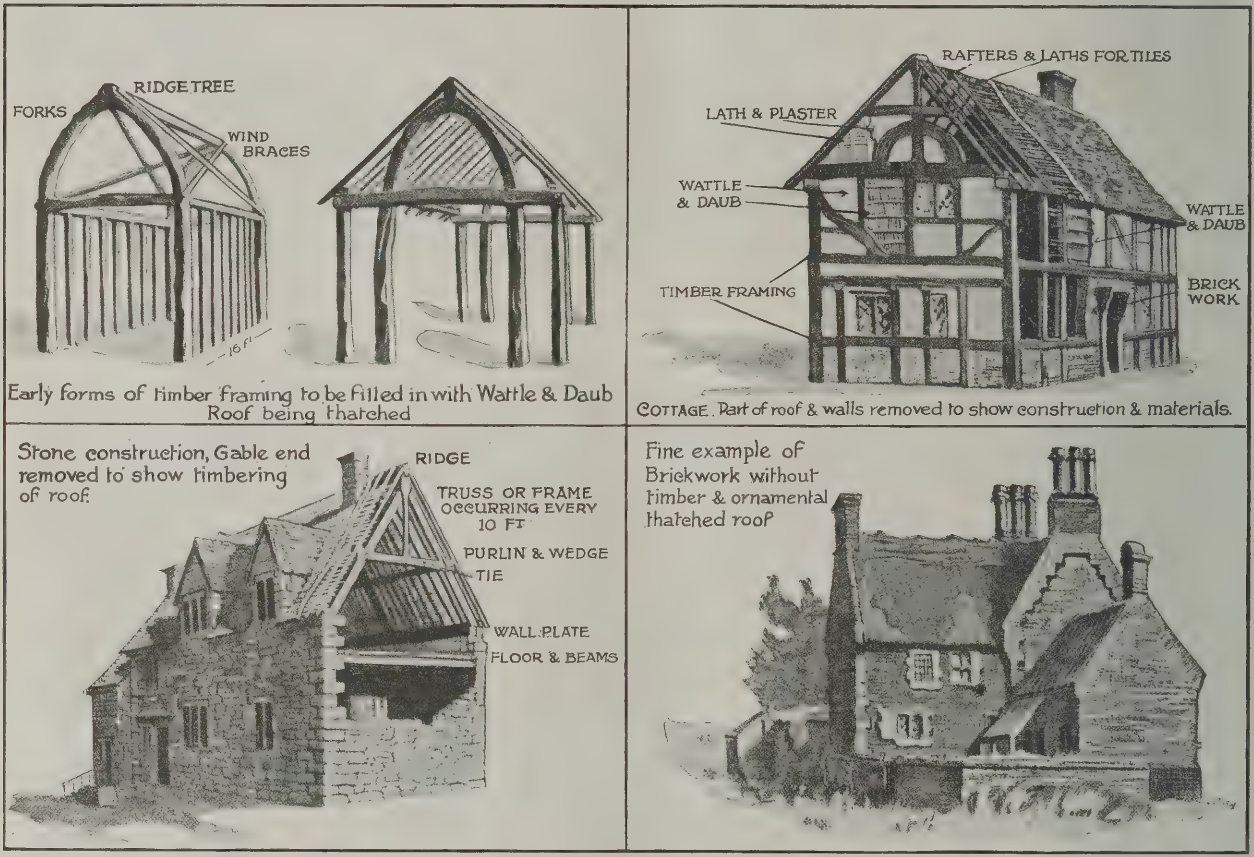
The cottage is a thing essentially English. Built of brick, stone, or timber framed, with a filling of lath and plaster, or wattle and daub, there appear to be many types; but with few exceptions one general plan is common to them all, though in course of years many old cottages have been so altered and added to, says a writer in a recent issue of *The Sphere,* that this original plan is hardly discernible.

At the time when the manners and customs of the country called for cottages the inhabitants of each district built for themselves, using those materials which were ready to hand, for the transport of building materials was so costly as to be prohibitive. Timber was plentiful and easy to work, which accounts for the timber frame so much used.

For a proper understanding of the old English cottage, its origin and growth, it is well to consider the buildings which preceded it, also the social history of the country from the Norman conquest and its feudal system up to the seventeenth century, when the building of cottages practically ceased.

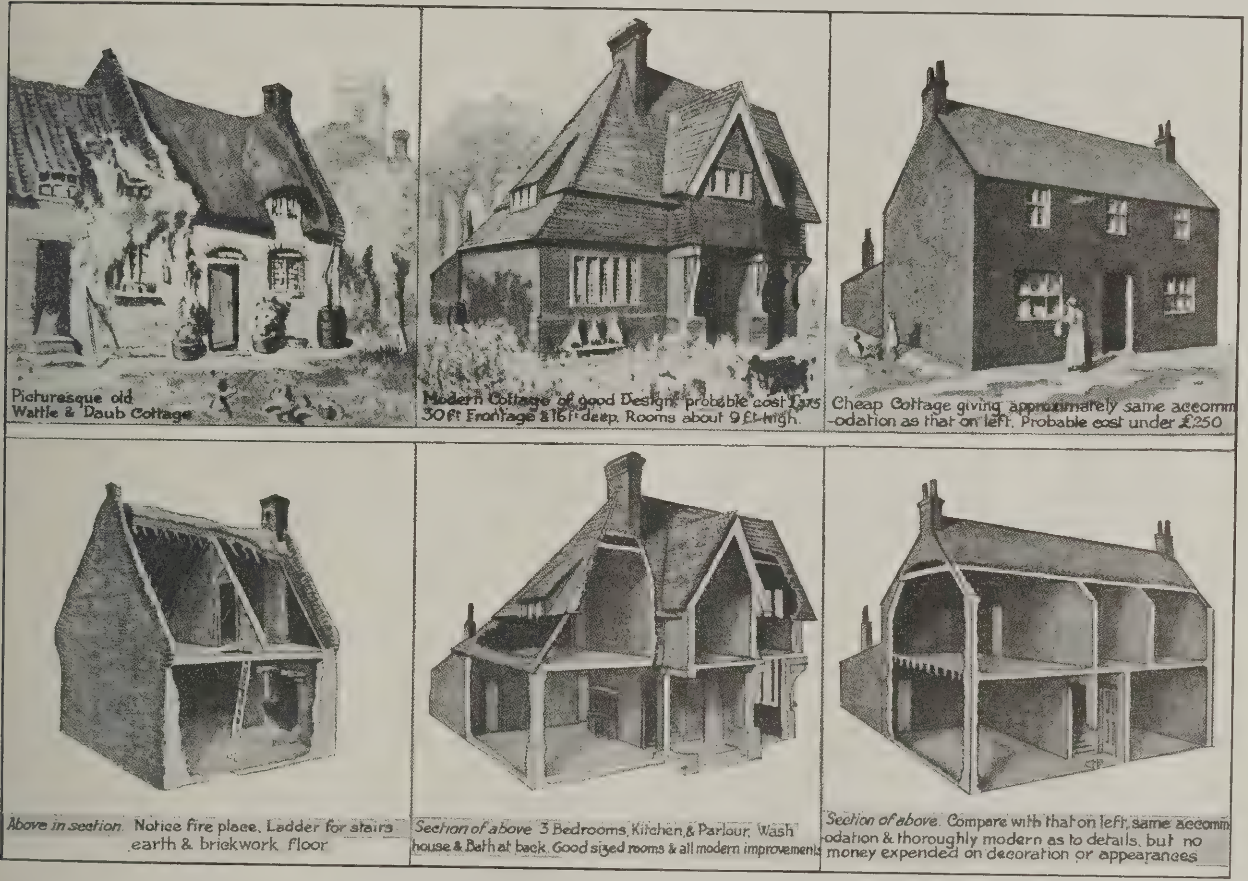
When the Normans obtained possession of this country few stone buildings of any sort existed, and the use of bricks and tiles was practically unknown. William divided England into manors, which he gave to his followers. The lord of a manor lived in his hall, which did not differ greatly from that of his Saxon predecessor. Built of wood, there was one large room open to the rafters. In this apartment the feudal lord, his family, servants and retainers took their meals. There was a dais or raised platform at one end and perhaps one or two smaller rooms for the lord and his family. The walls and windows were often beautifully decorated, but rushes covered the floor, and the smoke from the fire on the hearth made its way out through a hole in the roof.

The lord of the manor usually farmed his own land through a bailiff. Next in the social scale


RIDGE TREE
FORKS
WIND BRACES
16 FT
Early forms of timber framing to be filled in with Wattle & Daub
Roof being thatched
RAFTERS & LATHS FOR TILES
LATH & PLASTER
WATTLE & DAUB
TIMBER FRAMING
WATTLE & DAUB
BRICK WORK
COTTAGE. Part of roof & walls removed to show construction & materials.
Stone construction, Gable end removed to show timbering of roof.
RIDGE
TRUSS OR FRAME OCCURRING EVERY 10 FT
PURLIN & WEDGE
TIE
WALL PLATE
FLOOR & BEAMS
Fine example of Brickwork without timber & ornamental thatched roof

Types of Old English Cottage Construction—Views Showing Several Examples Ranging from Primitive Timber Framing to Brick Construction were the freemen, who worked on their own land, for which they rendered certain services to their lord; lowest of all were the serfs, who were practically the property of their employer. Most of these people were housed in the great hall; any living outside inhabited what were mere hovels.

This state of feudalism first came to an end in the towns, which obtained their freedom and charters in return for money payments to the king. Later the decay of feudalism spread from the towns to the country, and payments of money were made to the overlord in place of personal service. The yeoman (freeman) class grew in numbers and prosperity; it was farm, feorm being the word for the rent paid, they who furnished the English archers who won the Battle of Crecy. From this time dates the English. Finally, the lower classes were paid daily wages and were allowed to work for whom they wished.


Picturesque old Wattle & Daub Cottage
Modern Cottage of good Design, probable cost £375 30 ft Frontage & 16 ft deep. Rooms about 9 ft high.
Cheap Cottage giving approximately same accomm-odation as that on left. Probable cost under £250
Above in section. Notice fire place, Ladder for stairs earth & brickwork floor
Section of above 3 Bedrooms, Kitchen, & Parlour, Wash house & Bath at back. Good sized rooms & all modern improvements
Section of above. Compare with that on left, same accommodation & thoroughly modern as to details, but no money expended on decoration or appearances

Types of Old English Cottage Construction—Six Views Showing External and Internal Appearance of More Modern English Construction

The middle of the fourteenth century was a time of great prosperity. Successful in their wars on the Continent, all was peace and progress at home. No longer directly dependent upon their overlord the people needed houses and the first laborers' cottages were built. They had a timber frame with wattle and daub filling, clay floor and thatched roof, but no chimney and, of course, no glass in the windows. Note the illustrations in the upper part of the panel of pictures presented upon the first page of this article.

Suddenly the growing prosperity of the country was brought to a complete standstill when in 1348 came the Black Death. Half the population died, and a period of desolation and complete stagnation followed. The prices of all commodities rose. Landlords could not let their land—there was no one to take it. Labor was scarce. What laborers were left demanded greatly increased wages. Agriculture was at a standstill and the building of cottages ceased, for there was no demand for them.

The exactions of Henry VII. and the extravagances of Henry VIII. fell heavily on the country-people, but all the time the nation's wealth was growing. With the advent of Elizabeth the whole face of the country was changed. The agricultural districts benefited as well as the towns. It was a time of life and progress. The coinage, which had been debased, was restored to its proper value. Trade prospered; money became plentiful. The ideas and minds of the people grew as at no other time in English history. The population doubled itself in sixty years. This was the great cottage-building period in England. It lasted well into the seventeenth century and then practically ceased.

Many cottages have been built in recent years but of a very different type. For the most part soundly constructed and comfortable, they are rarely beautiful and must always lack the charm which age lends to the older buildings.

The early cottages of the fourteenth century were copied from the sheds of the period in which the oxen employed in the fields were housed. The ground, having been cleared and leveled, a rectangular space was marked out, and at either end a wooden arch made of rough-hewn timber was set up. These arches stood 16 ft. apart and were connected by a pole which formed the ridge of the roof. Four timbers were added at the eaves level, and under the rafters of the roof were diagonal wind braces to prevent racking. Wooden pegs were used as nails to fasten the timbers at the joints. The frame once erected was further divided with smaller timbers, the spaces left being filled in with wattle and daub—twisted hazel rods covered inside and out with clay—which was brought flush with the timber work.

The roof was thatched and the floor of clay. There was no chimney and no glass in the windows, and only two rooms, one over the other, the upper usually being reached by a ladder. Sometimes the roof would be continued till it nearly reached the ground; the extra space thus obtained formed an additional room or leanto outhouses.

On this plan all the old cottages were built, additions were made, and the original plan elaborated as time went on and larger cottages were needed.

A great advance was made in the reign of Queen Elizabeth. Then chimneys became general. Before that time only very large houses had any; these at first were built outside the main walls of the house and were constructed of brick.

It was in the sixteenth century that the use of bricks became common, first of all as a filling to the timber-framed houses and later for the entire construction of the walls. This was the period of ornamental brick work in pattern and paneling on the walls and high decorated chimneys and gable ends. Glass became much cheaper, and the windows of houses were glazed.

Stone, except for the foundations for timber framing, was not much used till a later period owing to the cost of working.

As long as timber was plentiful the amount of wood employed was prodigious, but by the end of the sixteenth century oak, the wood most favored, was getting scarce, and in 1604 wood was forbidden to be used in London for the fronts of houses. Timber rose enormously in price and its use became very restricted. As a rule the more timber to be seen in a house the greater is its age.

The old thatched roofs were of high pitch so that the rain should run off as quickly as possible. In some districts stone slabs were used for roofing, but owing to the great weight the pitch had to be less.

As the population increased cottages continued to be built, but with the eighteenth century the great building period was over.

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System of Measuring Builders Work

In view of the discussion which is going on in regard to the quantity system of estimating and which is bringing out expressions of opinion from both architects and builders, it is interesting to note the "Standard System of Measuring Builders Work in South Africa," which has recently been adopted by the South African Institute of Quantity Surveyors and accepted by the National Federation of Building Trade Employers in South Africa, the Public Works Department of South Africa and other public bodies. The feeling exists that it will not be long before the system will go into almost universal use in that section of the world.

Generally, the system provides that: All materials and workmanship should be fully described, so as to give a clear idea of the character and cost; everything shown on the drawings and described in the specification should be embodied in the quantities, and nothing should be left to assumption.

All work should be measured net as fixed in the building; no allowance made for waste except where otherwise defined; passings to be measured as hereafter defined in the various trades; the term "measured net" is to mean the finished surface of quantity—i. e., all openings deducted, and no allowance made for laps except where otherwise defined.

Where work is unusually constructed or elaborately detailed, a sketch may be inserted in the bill to illustrate it.

The work of each trade is to be given separately, and billed under the trade headings and items as described, excepting in the case of provisional work, where the various trades may be brought together under one heading.

Unless described as "stock," all work is to be considered as executed from detail drawings, or vice versa.

All items in each trade (unless otherwise described) are to include for all patterns, templets, labor and materials pertaining to that trade required in making, delivering, getting in, hoisting and fixing the article in position.

Constructional ironwork—such as joists, girders, columns, stanchions, etc., should be kept separate to each floor; brickwork, masonry, and concrete should be kept separate where fixed at a hight exceeding 50 ft. above ground level, or other defined level, and from thence upward in ranges of 20 ft.

Any work the quantity of which is uncertain should be described as "provisional," and remeasured as executed.

In circular work comprising material and labor, "quick" and "flat" sweeps should be kept separate; a radius of 10 ft. and over to be "flat," and under 10 ft. "quick."

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Holding Contractors to Schedule

A rather unique method of holding contractors to their schedule has recently been adopted by an architectural firm in California. It consists in the use of a blackboard so ruled as to show the progress the contractor is making on the job. The blackboard is prominently displayed on the front of the building in course of erection and the time allowed each contractor to complete his part of the work is indicated by a heavy white line. If an extension of time is allowed through avoidable delay a red line is drawn above the schedule which shows the public at a glance just who is responsible for delays. Naturally, the contractor wishes to avoid such notoriety as it does not tend to add to his reputation as a builder, hence he puts forth every effort to finish his part of the work according to schedule.

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San Diego Exposition

Those who are planning outdoor exhibits and buildings to contain individual displays at the San Diego Exposition have been notified by Director General H. O. Davis that all such structure must be ready for installation by July 1 of the current year.

Some of the Various Kinds of Masonry

Sketches Showing the Appearance of Different Kinds of Stone Work—A List of the Terms in Common Use

By D. P. Barry

In recent issues of the paper there has appeared more or less discussion as to certain phases of masonry work and thinking the matter may be of interest to the many readers of *The Building Age* who are engaged in this particular line, I have prepared a few comments accompanied by illustrations relating to different kinds of masonry. At the outset I would state that the following are some of the more important terms in common use relating to this branch of industry.

Facing is composed of those stones exposed to view, while the backing or filling are those which are behind the facing in retaining walls, abutments and arches; also between the faces in piers which are exposed to view on all sides.

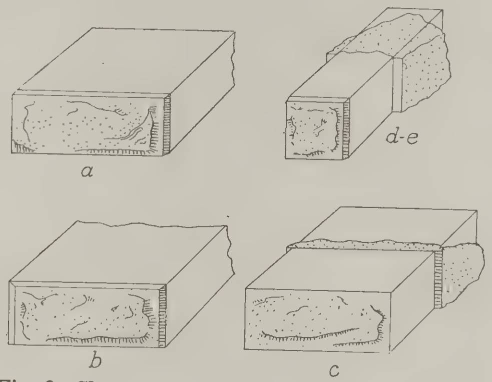


Fig. 3—Showing the 5 Different Forms into which Rough Stone Is Cut for Building Purposes

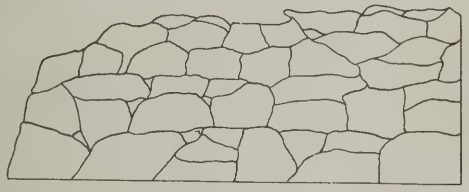


Fig. 1—An Example of Uncoursed Rubble Work

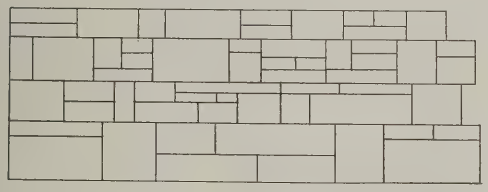


Fig. 2—An Example of Coursed Rubble

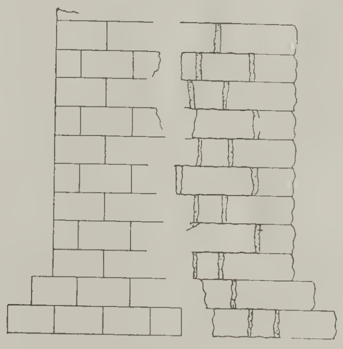


Fig. 6—Cross Section of Ashlar Work

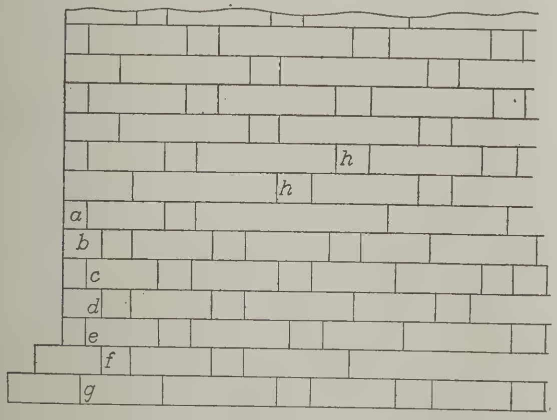


Fig. 4—Elevation of a Piece of Ashlar Work

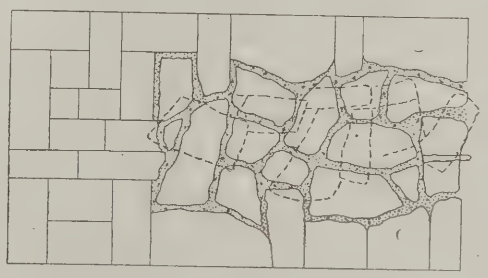


Fig. 4—Plan View of Ashlar Work

Some of the Various Kinds of Masonry—Details Showing How the Stones Are Laid

Headers are stones, the ends of which are seen on the face of the wall and all stones which are parallel to them.

Stretchers are those stones, the length of which is seen on the face of the walls and all stones parallel to them.

Quoins are the cornerstones. These are headers on one face and stretchers on the other.

A course is one complete horizontal layer of stone including the facing and backing or filling.

Joints are spaces between stones. They are bed joints when horizontal and side joints when vertical.

Bond means the overlapping of the stones by which no continuous vertical or inclined joint exists. Sometimes occasions arise when the continuity of the horizontal joints is broken.

Batter means the inclination of the face of a wall to the vertical plane.

String courses are courses of wide stone which project slightly beyond the outside face of a wall.

Rubble masonry.—This class of masonry covers a wide range of construction from the commonest kind of dry stone work to a class of work composed of large stones laid in cement; that is from walls made of river jacks or round bowlders to roughly dressed or squared stones laid with or without mortar and any combination of these stones.

Uncoursed rubble is where no regular horizontal courses are used, as in Fig. 1 of the sketches. The joints both in horizontal and vertical planes are broken and irregularly so. Special attention should be given to bond on side joints.

Coursed rubble differs from uncoursed only in having at certain vertical intervals continuous horizontal joints as clearly illustrated in Fig. 2. The thickness of any one course is regulated by that of the cornerstones and an occasional intermediate bond stone. The spaces between are usually filled with uncoursed rubble leveled to the line of the cornerstones. Rubble is commonly regarded as third-class masonry.

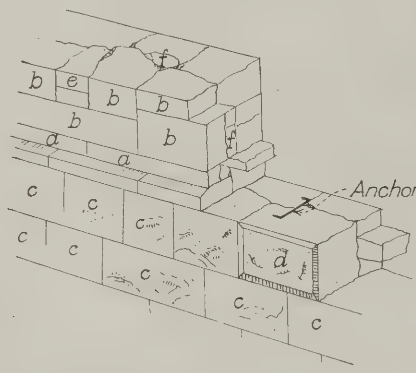


Fig. 7—Portion of a Wall Showing Several Styles of Ashlar Work

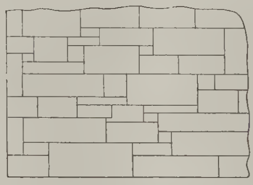


Fig. 8—Broken Range Work

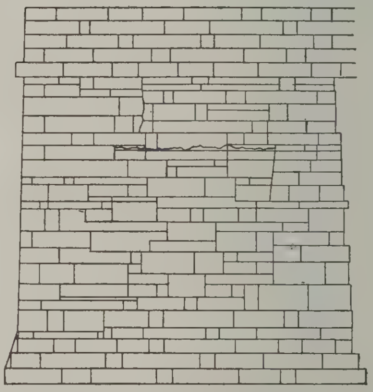


Fig. 9—Elevation Showing Random and Broken Range Work

Some of the Various Kinds of Masonry—By D. P. Barry

In Fig. 3 of the accompanying sketches is shown the five different forms into which rough blocks of stone are cut for ordinary building purposes. Here *a* is a prism fully dressed on beds and joints; *b* is a common trapezoidal form; *c* is a stone simply coming within somewhat liberal specifications. These are called stretchers and are rarely less than 3 ft. or more than 6 ft. in length on the face; *d* and *e* are good forms for headers. Their lengths perpendicular to the face vary from 3 to 6 ft.

Ashlar, Range Work and Block-in-Course Masonry.—All these classes of masonry are composed of well-dressed and squared stones. The difference between them is mainly in the dimensions of the stone, the thickness of the mortar joint and the extent of the bond secured.

Range-work as generally understood differs from ashlar only in having thicker mortar joints, say over ½ in. and less than 1 in., whereas ashlar has joints from ⅛ in. to ½ in. in thickness, according to the quality of the masonry. This is well illustrated in Figs. 4, 5 and 6, which represent front elevation, plan and cross section of first-class ashlar work. In Fig. 4 the zig-zag joints are represented by *a, b, c, d, e, f, g,* while *h h* are short bond headers. At the left, in Figs. 5 and 6, are shown the cut backing and at the right is seen the large rough stone backing.

Block-in-course masonry differs from ashlar only in being built of smaller blocks, the depths not exceeding a foot.

Ashlar masonry has an inferior limit of 1 ft. in depth and ranges as high as 3 ft. and more. In all three classes each course is of the same thickness throughout. All bed joints are usually horizontal and all side joints vertical.

In ordinary and massive masonry the stretchers in ashlar masonry have any lengths from 3 ft. to 6 ft. and the headers have any width from 1 ft. to 3 ft. and even more. No vertical joint is permitted under or over a header unless it is 3 ft. wide. The length of headers should be 4 ft. to 6 ft—never less than 3 ft.

Ashlar and range-work are generally called first-class masonry. A rougher range-work or a first-class coursed rubble is called second-class masonry. Roughly coursed rubble is called third-class masonry. Fig. 7 illustrates several styles of ashlar work. Here *d* shows one-stone coursed dressed ashlar with margin draft; *f* rubble filling back of ashlar; *e* bonder in ashlar; *c* coursed quarry-faced ashlar; *b* random range dressed faced ashlar, and *a a* random range quarry faced ashlar.

Broken range is that kind of masonry in which the course is of uniform thickness for only parts of its length as shown in Fig. 8.

Random range is that sort of masonry which is not laid in courses at all. This is sometimes designated as "one-against-two" or "two-against-three." The first term indicates that there is one stone on one side of a vertical joint and two on the other, and similarly for the second term. This is very clearly shown in Fig. 9 of the sketches.

The example submitted in a recent issue of the paper by "R. H. H.," of Rouses Point, N. Y., is a good example of random range, except for the second joint from the left at the top and the second from the right at the bottom.

In regard to the inquiry of this correspondent I would say that further research convinces me that his specifications are wrong.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Arrangement of Bath Room and Fireplace in House Construction

From P. E. C., Kelowna, B. C.—There are two items in planning concerning which I would like to have the opinion of the practical readers of *The Building Age*. I have been very much interested month by month in seeing the most useful information which is provided for us all, but there are two things which I find many architects and builders quite overlook. One of these is the position of a fireplace, and in nine times out of ten you will see it placed as indicated in Fig. 1 of the sketches.

Now, in my opinion, this is a very unsuitable location, for there are openings both sides of it—one into the dining room and the other into the hall—thus making it practically impossible for the occupants of the living room to sit around the open fire. Then, again, there is sure to be a draft.

Now, if I were planning the house I would put it in the outside wall either at the front or the side, where there would be ample opportunity to sit around it without being in drafts or in the way of any one passing from one room to another.

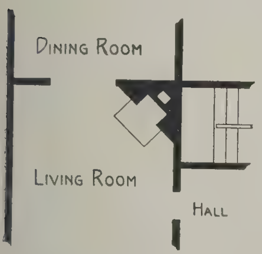


Fig. 1—Frequent Position of an Open Fireplace

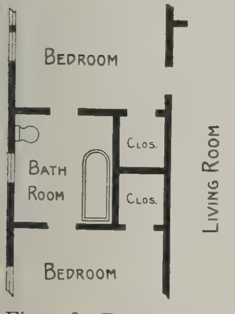


Fig. 2—Poor Bath Room Arangement

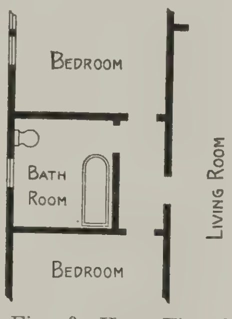


Fig. 3—How Fig. 2 Could Be Improved

Arrangement of Bath Room and Fireplace in House Construction

The second feature relates to the arrangement of bathrooms and toilets. Now, on page 55 of the March issue of *The Building Age* there is shown a bathroom arrangement which to my mind is most objectionable, and which the reader will readily understand from an inspection of Fig. 2. No one can use this toilet except those who are in the two bedrooms out of which it opens. You cannot expect a lady in either room to allow any man in the house in her bedroom, so that he can go through to the bathroom, and then, again, suppose one had visitors in the house? Is it nice to think that you might both be opening opposite doors at the same time? This, too, is such a common arrangement that I am most interested to know what advantage there is to counteract what seems to be so many disadvantages.

I would suggest the arrangement shown in Fig. 3 as far preferable, for it not only keeps the toilet private, but there are no bedrooms opening into the living room, which should, if possible, be avoided.

This is a phase of planning which I shall be glad to see discussed by interested readers of the paper.

The Cost of Brick Houses

From R. E. J., Fiskill-on-Hudson, N. Y.—I have read the very interesting article on "The Cost of Brick Houses" which appeared on page 52 of the March number of *The Building Age*. I would like very much to know from what country these men come who the "manufacturer" quotes as being able to do the work there described? He would indeed be "some bricklayer" who could lay 3,000 brick in a wall—not foundation of engine beds, etc.—every day in the week. I would not care to have a wall built for me with brick laid at that rate as I know the bricklayer would have no time for neatness or detail work.

As for one or two hod-carriers being sufficient to tend twelve bricklayers, I am inclined to the opinion that that man is talking through his "Knox." Those kind of hod carriers never "grew." "Manufacturer" might know how to make brick, but as to bricklaying he has a lot to learn.

Repairs for Concrete Roof

From T. A., Lancaster, Pa.—I have a concrete roof 8 in. thick with a pitch of 1-3 and leaks have developed in it. I would be glad to have any assistance which practical roofers can give to me as to the best way of repairing these leaks. If I mopped this roof with a good coat of hot asphalt would it stop the leaking, or will contraction and expansion crack the asphalt? I figure to put on about one pound of the asphalt to the square foot.

Payment for Blue Print Details

From Builder, Redford, N. Y.—If the correspondent from Rock Port, Mo., signing himself "Subscriber" prepared drawings for the purpose of bids he is entitled to pay for them, he having no more expectation of doing the work than anybody else. If he was called in to do the work and made the drawings to show the owner what he intended to do he should reckon the time for drawing them just the same as building or laying it off. Presumably it was not necessary to make blue prints for his own use.

Criticism Wanted of Horse Barn Truss

From P. E. C., Kelowna, B. C.—I would be glad to have the opinion of C. L. Dean, who contributed the barn truss details in the January issue of *The Building Age* on the form of horse barn truss, sketches of which I am sending herewith. I append two ideas for barn truss—one on his scheme, Fig. 1, and my own idea, Fig. 2. Will he please tell me which he considers the better and his reasons therefor.

The span, 30 ft., is the same, only this has to be built up on the loft floor line and not as his is presumably, from the ground.

I like his truss, but it seems rather expensive and then how about the floor and posts to carry this? Perhaps he will be good enough to give a line idea of what he thinks would be preferable.

An outline of the building is also shown in Fig. 3 of the sketches.

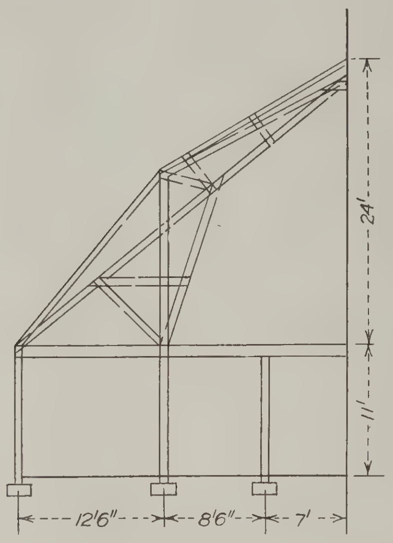


Fig. 1—Barn Truss Constructed on the Plan Suggested by Mr. Dean

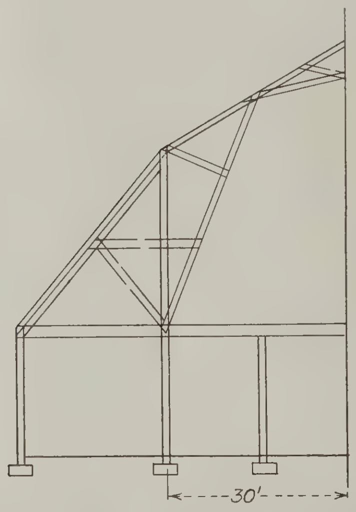


Fig. 2—Truss Arranged According to the Ideas of "P. E. C."

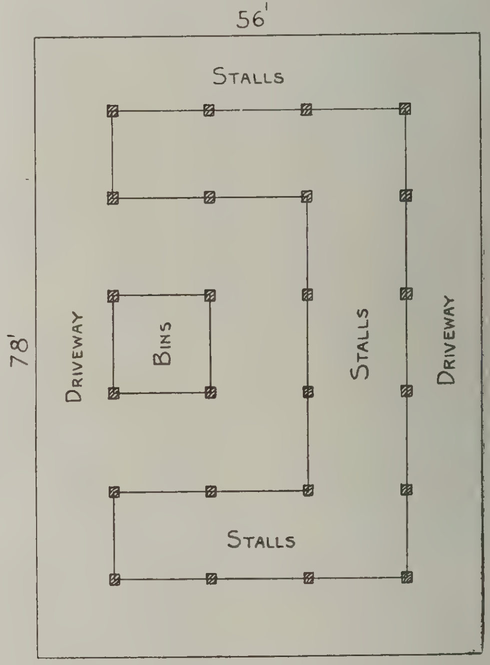


Fig. 3—An Outline of the Barn

Criticism Wanted of Horse Barn Truss

Making a Party Wall Soundproof

From Builder, New York.—What "R. J. S.," of Maspeth, L. I., means by "4 in. of fireproof material between the studs," as stated in his communication on page 52 of the May issue is not altogether clear. If he means the space between the *sides* of the studs he may safely follow Fig. 5 on page 75 of the issue of *The Building Age* for February, 1913. If he means between the *edges* of the studs he may follow Figs. 3 and 4 on same page of same issue.

Workmen's Compensation Law

From Constant Reader, Walden, N. Y.—The following are some of the inconsistencies of the workmen's compensation law as viewed by the writer from the standpoint of a builder. The new law, to classify the different occupations according to the hazard involved, gathers them into groups which is all right, but allow me to ask why should farming be exempt from the law or why should municipal corporations be exempt when its employees are engaged in the same occupations as are covered by this law?

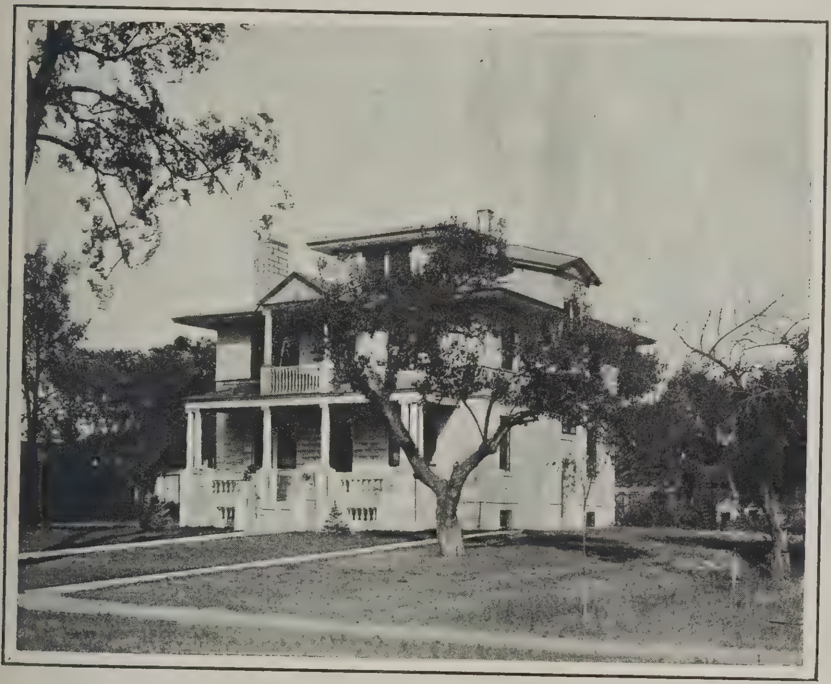
While farming is exempt under the law there are many dangerous occupations connected with the work on a farm and many accidents occur—some fatal and some that leave the employee a cripple for life. Many farmers do their own building about the farm with concrete and lumber, using their farm laborers for such work, which under the new law are exempt.

Some of the villages of the state have their village officers hire laborers and build their sidewalks and then assess a portion on abutting property, and under the law they are exempt, although they are in direct competition with contractors in those lines of work.

It does not seem to me that the employers of union labor should be made to provide compensation for their employees while a large class of employers of non-union labor are exempt, or that the state should protect a large percentage of laborers by compelling their employers to insure them and on the other hand exempt numbers of others who are in employment which is not unionized. The writer is perfectly satisfied that the laborer should be protected as should also be the employer, but he does not believe in making fish of one and meat of another. If necessary to compel the protection of one class of laborers why not all with just rates according to the risks.

Construction of a Baker's Brick Oven

From B. P. D., Clinton County, N. Y.—In my opinion "W.S.W.," Beverly, Mass., who asks in the May issue if the paper about the construction of a baker's brick oven is not in the swim very deeply. He is making a pretty large sized oven. His customer should furnish all the details. He should use an elliptic arch about 3 ft. high in the center and back gable or end should be built up to the arch. He will require two thicknesses of brick in the roof, walls and floor, and it should be well backed.



General View of the Completed Building

Design of an Eight Room Dwelling—By A. Pritzlaff

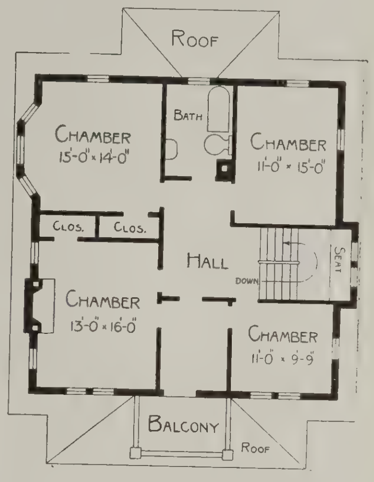
In the extreme right hand corner should be an opening for a fireplace; in the extreme left hand corner the flue opening, and in the center should be placed the large opening for taking out and putting in bread, etc. These openings are in the front. False work must be placed in such a way that it may be easily and safely taken out. These are the essentials of the job.

Design of an Eight-Room Dwelling

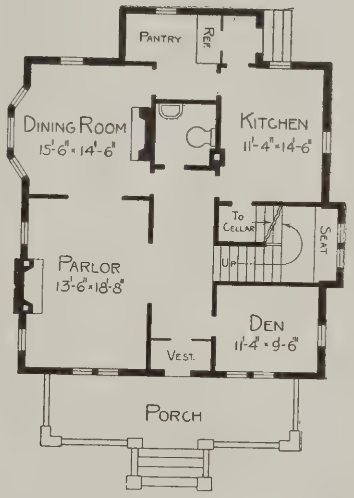
From A. Pritzlaff, Springfield, Mass.—Thinking some of the readers of the paper may be interested in the house which I have recently completed I am sending a photograph showing the exterior, also floor plans showing the arrangement of the rooms. It will be seen that on the first floor there is a parlor and a dining room to the left of the main hall and a den and a kitchen at the right with stairway between leading to the second floor. Under the main flight are the stairs to the cellar. Communication between the kitchen and dining room is established through the medium of a commodious pantry with space for a refrigerator, the latter being so placed that it may be iced from the rear entry.

On the second floor are four sleeping rooms and bath room and between the two front chambers is a space which may be utilized as a sewing room or for other purposes.

The foundation walls of the house up to the sill are built of concrete blocks 12 in. thick, the blocks being made of marble dust and white cement. The exterior walls of the second story are covered with shingles exposed 5 in. to the weather. The roof is covered with slate. The floors are double, the finish being maple.



Second Floor



First Floor—Scale 1/16 In. to the Foot

All walls from sill to wall plate at the foot of the rafters are closely packed with mineral wool furnished by the United States Mineral Wool Company, New York City. This material is fire-resisting and has rendered the house very warm in winter and kept it cool in summer.

The parlor and the chamber immediately above it have mahogany trim. The dining room, halls and stairs are finished in quartered oak, the den in birch, the kitchen in pine, the chamber over the den in maple, the chamber over the dining room in black walnut and the chamber over the kitchen in ash. The trim in every chamber, it may be stated, is made to correspond with the furniture of the room.

The toilet room on the first floor is lighted by an opaque glass window in the rear and is also ventilated by a pipe leading to the roof.

The bath room has tile walls and floor and all plumbing is nickel plated. It is fitted with a Barlow Matchless heater, made by the Barlow Company, Holyoke, Mass. The house is heated by a Boynton hot-water heater.

What Readers Say of "The Building Age"

From J. J. G., Phoenix, Ariz.—In renewing my subscription to *The Building Age* for five years I desire to say that previous to the time I began to read it I had been taking a number of the best architects' and builders' magazines, but from a *practical* standpoint I consider *The Building Age* far superior to any magazine published.

From C. O. P., Tottenville, N. Y.—In entering my subscription to *The Building Age* for the ensuing ten years I wish to state for the benefit of those who may be interested that I subscribe to eight of the best trade papers of which I have knowledge. If I had to discontinue all of these papers but one I should keep *The Building Age.*

From P. D., Central City, Iowa.—Many of the readers have expressed their appreciation of *The Building Age,* and as I hold it in high regard I desire to say that I have derived more benefit from it than from all other books and papers combined.

From F. C. S., Bristol, Pa.—I am enclosing a check for the extension of my subscription to *The Building Age* for ten years. I wish to say I would not like to miss a single copy, as I find in it many items that are each worth a year's subscription.

From G. E., Seymour, Wis.—I have received my first copy of *The Building Age,* and I wish you to be sure and send it every month or oftener, because I need it. You may take your view of my appreciation of the paper from the following lines:

You're *some* paper Old *Building Age;*
I was surprised when I saw your page.
You're the first copy I got in my cage
After you attaining such very old age,
I not knowing you until this stage
Knowing you now Old *Building Age,*
I'll read you from first to the very last page.

From F. T., Sidell, Ill.—I have been a subscriber to *The Building Age* for about 15 years, preserving practically every issue during that period, and I often find occasion to look back over the old numbers for information of which I am in need. I certainly should not like to get along without it.

I closed up my year's work feeling very well satisfied. I completed a $5,000 bungalow which I had left over from 1912 and built a $10,000 schoolhouse at Ridgefarm, Ill. It is a district schoolhouse situated in the country about three miles from the place named. There are four districts in one, and it is the intention to carry the school children to and from the school.

From H. W. N., Salt Lake City, Utah.—I wish to say for the benefit of any of the readers who may be interested that I have taken *The Building Age,* formerly known as *Carpentry and Building,* for the past 25 years and have all the volumes bound. I highly prize these volumes for their valuable contents. In earlier days I submitted problems which you published in answer to inquiring correspondents, but of late I have not done so for the reason that there are so many experts who are now ready to solve any problem that may be presented.

I have been particularly interested in following the problems in stairbuilding and hand railing by Morris Williams, and have put up several stair rails according to instructions which he gave. I now feel such confidence that I believe I could put a rail around a church steeple or a tower if required. I could say a good many things in favor of *The Building Age,* but do not wish to take up the time. I wish the paper every success in the future.

From A. J. S., Pearl River, N. Y.—In view of the many expressions from practical readers of the paper as to the length of time they have been subscribers, I would say that I can go back ten years and get from the paper any information I want on almost any subject relating to the building business. I consider that the paper shows improvement every year that passes, and I certainly wish it still further success.

From W. H. C., Turk's Island, British West Indies.—In renewing my subscription to *The Building Age* permit me to say that the magazine is of great value to me and I intend to be a subscriber as long as I live.

Setting Out Wreath for Quarter Landing

From A. H., Johannesburg, South Africa.—Will Morris Williams kindly set out a wreath for the quarter landing of the stairs shown in the accompanying sketch. The hand rail is on the wall and the pitches are unequal. The angle is practically a square arris.

Answer.—In reply to the above Morris Williams furnishes the following comments and accompanying sketches.

The plan submitted by the correspondent is represented by the heavy lines in Fig. 1 of the drawings, where it is shown that the two landing risers at each corner stand one above the other. Such an arrangement of the risers is very defective, as shown in the elevation at *b* and *b′* of Fig. 3, causing the pitch at these points to deviate considerably from the pitch of the flights.

In the elevation Fig. 2 is shown a uniform pitch, being the resultant of a correct arrangement of the landing risers, as indicated in the plan, Fig. 1, by the dotted lines, where they are shown placed at a distance of half a tread—that is, 5 in. from the corners.

It cannot be too strongly emphasized that this method should be strictly adhered to in the arrangement of risers adjoining corners and quite as strongly that the method submitted by the correspondent is, of all others, the most to be condemned.

In the elevation Fig. 2 of the plan the face mold is shown developed in its position upon the pitch line. The letters *a′*, *b′*, *c′* represent the pitch of the tangents. To find the angle at *b′* take *b′* as center, extend the compasses to *c′* and turn around as shown. Again, take *c′* as center, extend the compasses to *b′* and turn around, cutting the arc from *c′* in *m*. Join *m* with *b′*, thus obtaining the face mold angle at *b′* by merely finding the intersecting point, *m*.

By drawing parallel lines to *a′-b′* and *b′-m′*, making the joints at *a′* and *m* square to them, the face mold is completed.

Only one bevel is required to square this wreath and is to be applied reversely—at the end *m* by directing it toward the inside, and at the end *a′* toward the outside. How it is found is shown at *z* Fig. 2.

By comparing the operation of laying out the face mold in this figure with the one shown in Fig. 3, the importance of correct arrangement of the risers is shown to be a matter of serious consideration.

In addition to the intricacy attending the laying out of the face mold in Fig. 3 the operation calls for two different bevels to square the wreath and also a ramp, either in the wreath itself or in the straight rail adjoining. From the wording of the correspondent's query it is assumed that these are the difficulties he encounters and which he desires to have explained.

The explanation is found in Fig. 4, which represents a plan and elevation of one corner indicating two different pitches for the tangents *a′*, *b′*, *c′*, and the ramp in the straight rail.

In Fig. 5 the two bevels are shown, and in Fig. 6 the face mold.

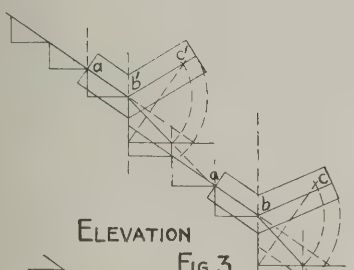
To lay out Fig. 4 first determine the size of the plan tangents, *a*, *b*, *c*. In the drawing they measure 10 in., but it would make no difference if they were more or less. Now unfold these tangents and draw the elevation of a few of the steps. Continue the pitch of the upper steps through *a′*, *b′*, *m* to *w* and draw the pitch of the bottom tangent as shown from *b′* to *c′*. From *z* draw the line *z-M* square to the top tangent, *a′-b′*. Now from *b′* as center, revolve the bottom tangent, *b′-c′*, as shown, to *c′′*. From the same center, *b′*, revolve the point *d* as shown to *d′*. Now connect *d′*, *c′′* and *b′*, thus determining the tangent angle of the face mold shown at *b′*.

The bevels shown in Fig. 5 are found as follows: Make the base, *z-c′-w*, equal to *z-c′-w* of Fig. 4. Make the hight, *z-n*, equal the line, *z-n*, in Fig. 4, and the hight, *z-m*, equal the line, *z-m*, in Fig. 4; connect *m-c′* and *n-w*.

The bevel shown at *m* is to be applied to the end *a′* of the wreath and the bevel shown at *n* to the end *d*.

In Fig. 6 is shown how they are applied—at the end *d* toward the inside, and at the end *a′* toward the outside.

It will be observed that the ⅞-in. curve at the angle *b′* in these operations is not considered. In



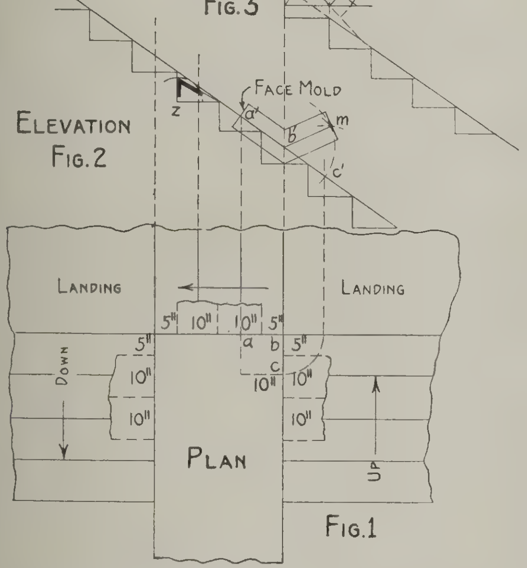


Fig. 1—Plan as Submitted by "A. H."
Fig. 2—Correct Elevation Showing Uniform Pitch
Fig. 3—Defective Arrangement

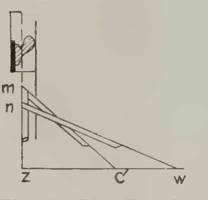


Fig. 5—The Bevels

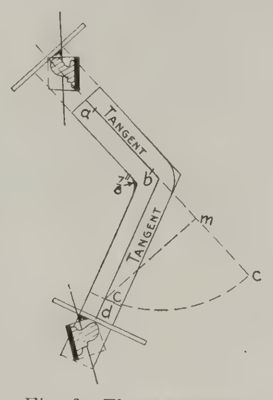


Fig. 6—The Face Mold

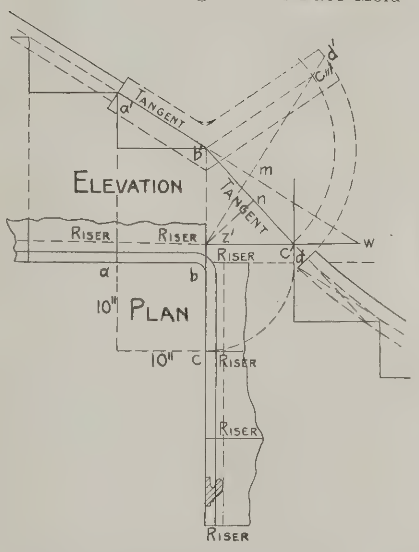


Fig 4—Plan and Elevation of One Corner Indicating Two Different Pitches

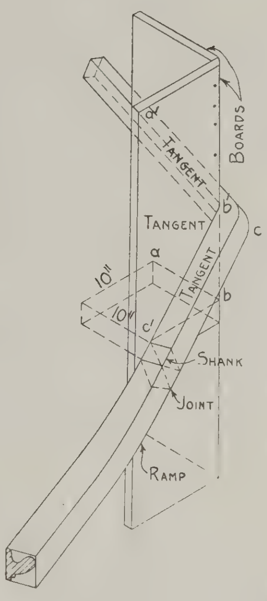


Fig. 7—Showing How the Twisted Piece of the Rail is Applied to the Pitches

Setting Out Wreath for a Quarter Landing—By Morris Williams this type of a twisted rail it is necessary only to develop the tangents. Such a small curve may be considered in a more practical way by fitting the rail after it is squared to a square corner. For such an operation nail two 12-in. boards together so that their surfaces will form a right angle to each other. Work the corner to a $\frac{7}{8}$-in. curve. Draw the pitch of the tangent, *a′-b′*, on one side and the pitch of the tangent, *b′-c′*, on the other. Now apply the twisted piece of the rail to the pitches and fit it to the $\frac{7}{8}$-in. curve, as shown at *b′* in Fig. 7.

Finding Radius of a Circle

From E. S., Sandusky, Ohio.—I notice in the April issue of the paper the letter of a correspondent telling how to find the center of a circle when a segment of it is given. There is one point concerning which I disagree with the author of that article and beg to offer a few comments.

In the first place it is stated that a segment is given. It is unnecessary to say that the length of chord and hight are given, for a segment is a portion of a circle bounded by an arc and chord and must have hight. As the author means it, take *A-B-C* of Fig. 1 of my diagrams as the segment and *B-E* is the hight of it; that is, *B-E* is perpendicular to *A-C* and bisects *A-C* at *E*. Draw *A-B* and *B-C*, erecting perpendicular bisectors on these chords. These bisectors meet in the point 3 as the perpendicular bisectors of the chords of a circle lie along the diameter of it and meet in a common point, the center. Hence 3 is the center and *A*-3 the radius of the circle required. It is not 1-3 nor 2-3 that is the radius, for a circle so described would not include the given segment.

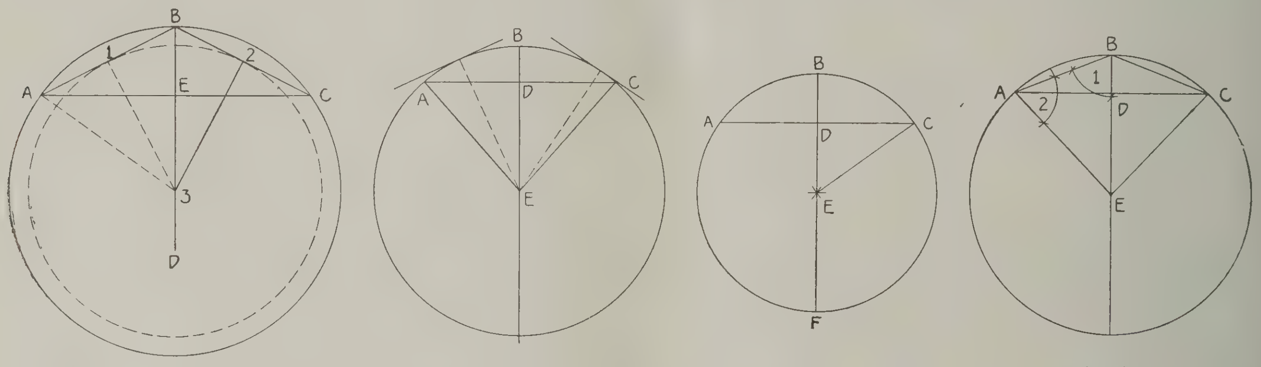


Fig. 1 Fig. 2 Fig. 3 Fig. 4

Finding the Radius of a Circle—Diagrams Accompanying letter of "E. S.," Sandusky, Ohio

Another method is as follows: Given *A-B-C* as the segment in diagram, Fig. 2, draw two tangents touching any parts of the arc of the segment and let perpendiculars fall from these to meet at *E*. This will be the center of the circle required and *A-E*, *C-E* and *B-E* will be radii of it. The perpendiculars will meet at *E* as it is a geometrical theorem that the perpendiculars to the tangents of a circle lie along the diameter and meet in the center.

Still another method is as follows: Referring to Fig. 3 of the diagrams *A-B-C* is the given segment. Take the dividers and try to strike a distance that will be equal from *A*, *B* and *C* cutting *B-F*. Such a distance is *C-E* and this will be the radius with *E* as the center.

This may be a longer method if one does not exercise some eye measurement before attempting to find the equal distance, but it is shorter in that it saves the use of lines.

A more exact method following the one last described is as follows:

Referring to Fig. 4 of the sketches, the given segment is *A-B-C*. Draw the chord *A-B*. The angle 1 is formed. Then construct angle 2 at *A* equal to angle 1. Draw the sides of this angle 2 to cut at *E*. Then *A-E* will be the radius. The line *E-C* is similarly formed.

B-E equals *A-E* so the circle will entirely contain the segment. *B-E* equals *A-E* being sides of an isosceles triangle and angle 1 equals angle 2 so if *A-E* equals *B-E* then *C-E* equals *A-E* as *E-C* also equals *B-E*.

In order to find the length of the radius numerically proceed as follows:

Referring again to Fig. 1 the rise *B-E* and the length *A-E* are known, *A-E* being one-half of *A-C*. The line 1-3 is drawn as a perpendicular bisector of the chord *A-B*. It then passes through the center of the circle and makes a side of the right triangle 1-*B*-3. This triangle is similar to the triangle *A-B-E*, the angle *B* being common.

Then

$$BE : B1 :: AB : B3$$

But to find *AB* we proceed as follows:

$$AE^2 + BE^2 = AB^2$$

Therefore

$$AB = \sqrt{AE^2 + BE^2}$$

$$B1 = \tfrac{1}{2}\,AB = \frac{\sqrt{AE^2 + BE^2}}{2}$$

Substituting these values we have

$$BE : \frac{\sqrt{AE^2 + BE^2}}{2} :: \sqrt{AE^2 + BE^2} : B3$$

Then *B*3 is easily found.

For example, assume *AE* = 6 and *BE* = 3,

Then

$$3 : \frac{\sqrt{36 + 9}}{2} :: \sqrt{36 + 9} : x$$

$$3 : \frac{\sqrt{45}}{2} :: \sqrt{45} : x$$

$$3x = \frac{\sqrt{45}\,.\,\sqrt{45}}{2} = \frac{45}{2} = 22.5$$

$$x = 7.5$$

The formula may be simplified by combining as follows:

$$BE \times B3 = \frac{AE^2 + BE^2}{2}$$

Campanile at University of California

The Steel Frame Work of the Sather Campanile at Berkeley, Calif.—Total Cost When Completed about $225,000

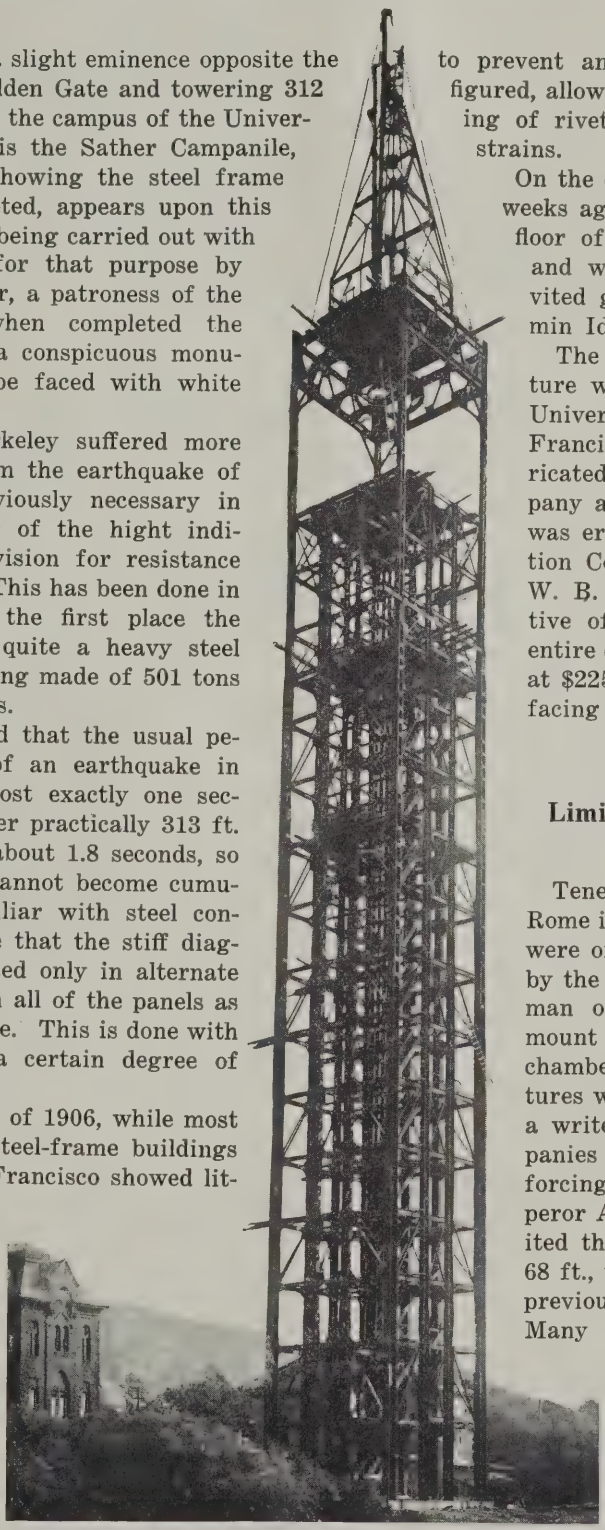
STANDING on a slight eminence opposite the far-famed Golden Gate and towering 312 ft. 7 in. above the campus of the University of California, is the Sather Campanile, a view of which, showing the steel frame work nearly completed, appears upon this page. The work is being carried out with funds bequeathed for that purpose by Mrs. Jane K. Sather, a patroness of the University, and when completed the Campanile will be a conspicuous monument, as it is to be faced with white granite throughout.

Buildings in Berkeley suffered more or less damage from the earthquake of 1906 and it is obviously necessary in erecting a building of the hight indicated to make provision for resistance to seismic shocks. This has been done in several ways. In the first place the structure is given quite a heavy steel frame work, use being made of 501 tons of structural shapes.

It has been found that the usual period of vibration of an earthquake in this district is almost exactly one second, while in a tower practically 313 ft. high the period is about 1.8 seconds, so that the vibration cannot become cumulative. Those familiar with steel construction will notice that the stiff diagonal bracing is placed only in alternate panels, instead of in all of the panels as is frequently the case. This is done with a view to giving a certain degree of flexibility.

In the earthquake of 1906, while most of the substantial steel-frame buildings in the city of San Francisco showed little superficial evidence of damage, it was found in many cases that rivets had been sheared off and in other cases that the shapes themselves had been sprung with the strain.

In designing the tower shown herewith it was accordingly decided to allow a certain amount of "give" to prevent the strain from being concentrated at one point. The braced panels are therefore made quite rigid and the unbraced panels—though stiff enough to prevent any excessive swaying—will, it is figured, allow sufficient spring to prevent shearing of rivets or buckling from concentrated strains.



Steel Work of Campanile at Berkeley, Cal.

On the completion of the steel work some weeks ago a banquet was given on the top floor of the tower to the steel workers, and was attended by a number of invited guests including President Benjamin Ide Wheeler of the University.

The engineering work on the structure was done by Prof. Derleth of the University assisted by Earl Cope, a San Francisco engineer. The steel was fabricated by the McClintic-Marshall Company at a contract price of $43,000 and was erected by the California Construction Company under the supervision of W. B. Kyle, San Francisco representative of the fabrication company. The entire cost of the Campanile is estimated at $225,000. The setting of the granite facing is now well under way.

◆

Limiting Heights of Tenements in Ancient Rome

Tenement houses existed in ancient Rome in the year 69 A. D., and that they were of considerable height is evidenced by the fact that Martial refers to a poor man of his acquaintance who had to mount 200 steps to reach his dark garret chamber. Total collapse of these structures was no uncommon occurrence, says a writer in *Harper's Weekly*, and companies existed for the purpose of reinforcing and propping houses. The Emperor Augustus as a safety measure limited the height of new houses to about 68 ft., which shows that some structures previously built exceeded that figure. Many of the streets of ancient Rome were very narrow and light must have been at a premium in these tall tenements.

◆

Another new building code for New York City is to be drafted, the work of revision to be done by Superintendent Rudolph P. Miller, of the Bureau of Building for Manhattan, assisted by the Building Superintendents of the Boroughs of Brooklyn, Queens, Richmond and the Bronx.

The Forest Products Exposition

An Unusual Display of Lumber Products in Which "Usefulness" Was the Keynote

IT is probably no exaggeration to state that the Coliseum never presented a more pleasing and attractive appearance than it did during the Forest Products Exposition which was held in Chicago, Ill., from April 30 to May 9 inclusive. It was sponsored by the National Lumber Manufacturers' Association, and although it was the first exposition of the kind ever produced in America, it was so successful from an artistic viewpoint, so interesting to the every-day man and woman, and so valuable to lumbermen themselves in awakening them to the possibilities of the idea, that it is quite probable the Forest Products Exposition will become an annual affair.

To the layman "wood is wood." The different varieties have been known more or less among woodworkers and dealers in wood and in objects made of wood, but never we believe have the manifold beauties of ordinary woods been revealed nor their utility so comprehensively presented as in the exposition which we are now considering.

Here was a Colonial garden, pictured in our illustrations, with a gateway, pergola, garden furniture and a one-room cottage of white pine. In this exhibition were relics of Revolutionary days, a section of a summer house of pine brought from Boston. It was new in the days when the British occupied that city. There were several equally old doors from the same locality aged with the years and shabby through neglect, but sound nevertheless.

Other buildings revealed such old friends as oak, yellow pine, birch and hemlock, all dressed up and showing to best advantage, at the same time making one realize the important part which the forests have played in the development of our country. What a friend wood has been to man! It has provided warmth and shelter; it has housed our commercial enterprises; spanned streams; served us in a thousand ways, and yet all so commonplace that we hardly realize it.

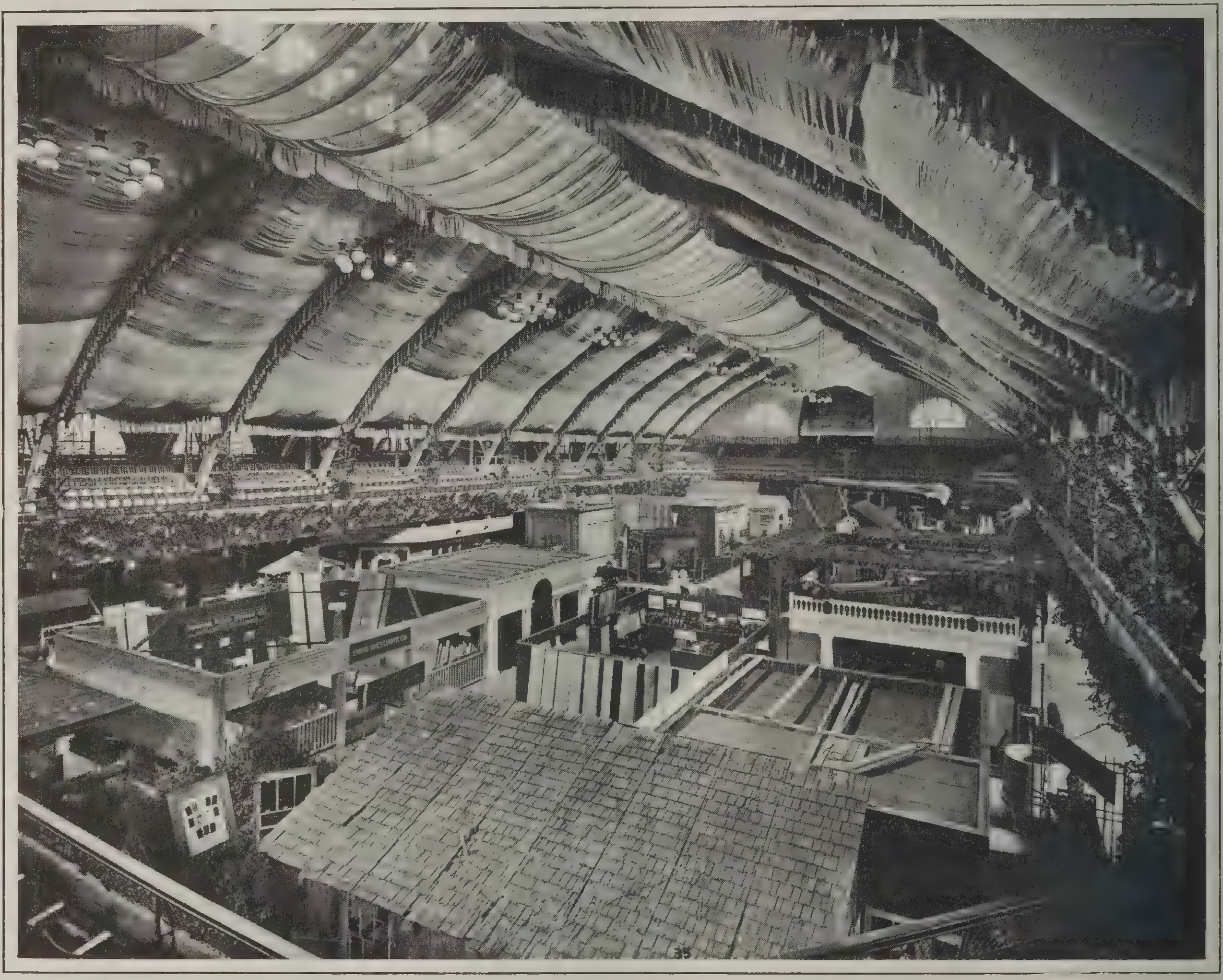


Photo by Lee Saylor

Interior View of the Coliseum in Chicago During the Forest Products Exposition

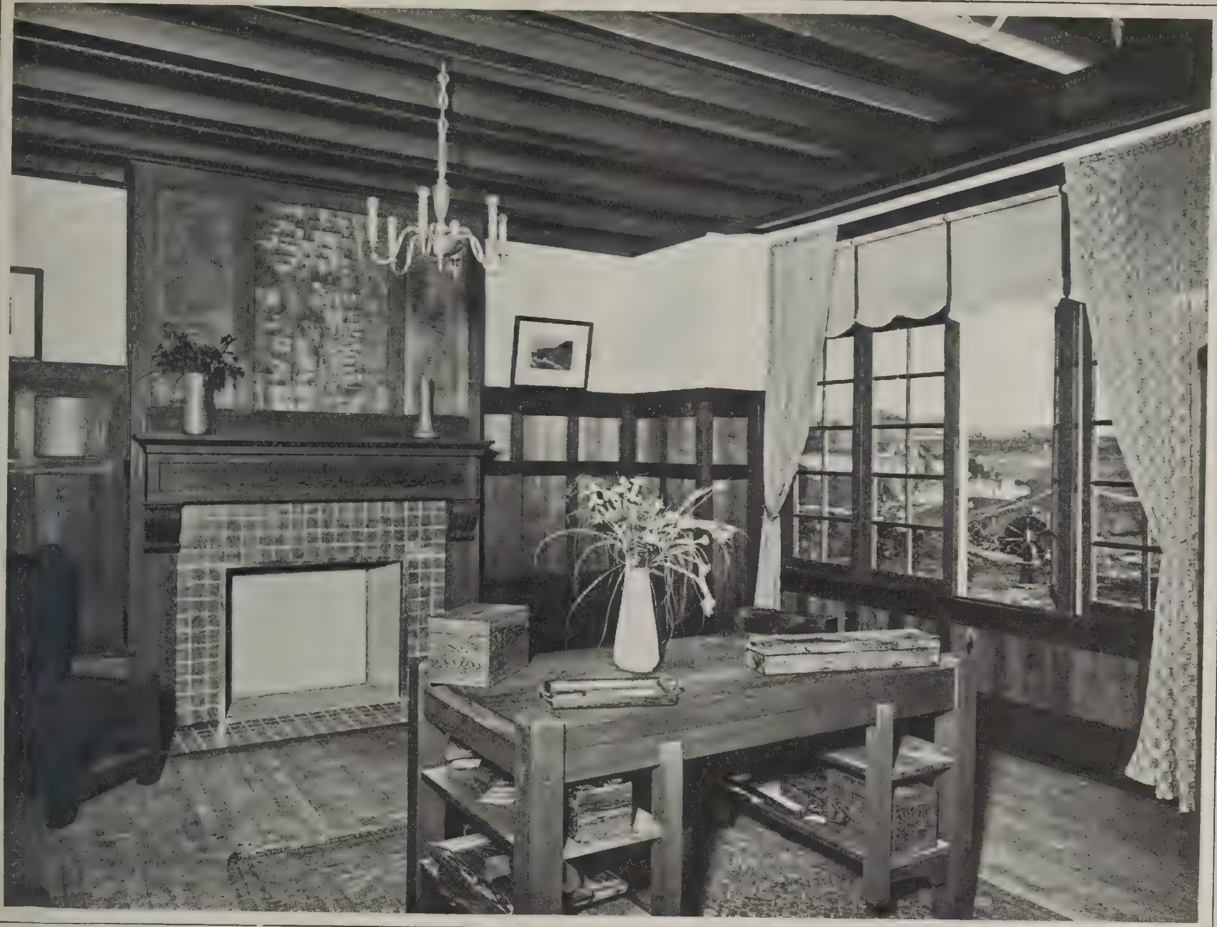


Photo by Lee Saylor

Interior of a Cypress Dwelling, Showing Panels, Trays and Boxes of What is Known as Sugi Finish

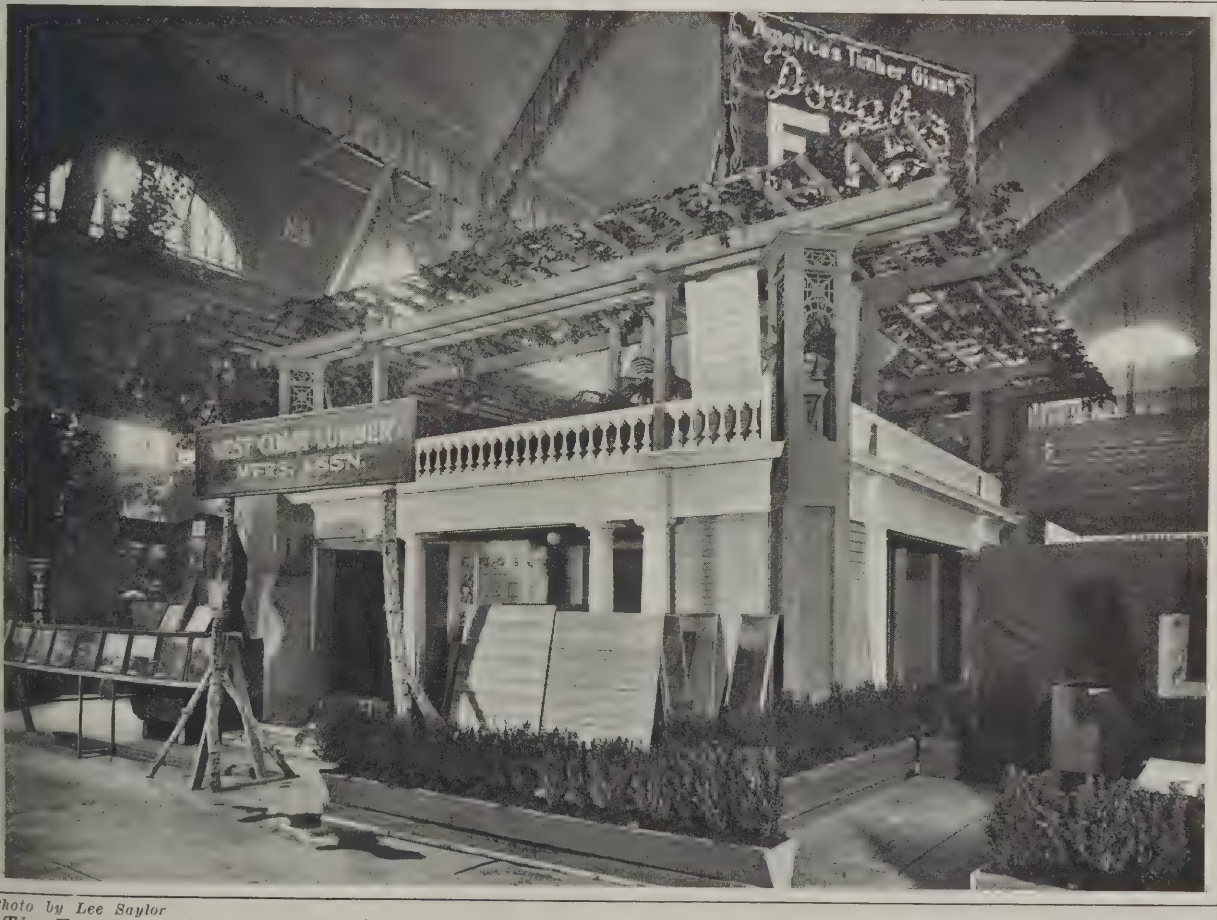


Photo by Lee Saylor

The Forest Products Exposition—A Display of Douglas Fir so Designed as to Show the Corners of Four Rooms Finished in This Wood

Then, too, the visitors were introduced to woods comparatively unknown to the average layman, such as red gum, cypress, Douglas fir, redwood, etc. Only recently have these beautiful and useful products of the forest stepped into the lime light of publicity. Readers of magazines, as well as of trade and class journals, have heard these names before. The general public, however, has never had an opportunity to see the "real thing," both in its natural and finished state.

Cypress, "the wood eternal," was well presented. One saw it as an interior finish of remarkable beauty. The Sugi finish gives a Japanese effect that is attractive and interesting. This is produced by burning the surface of the wood with a blow torch. It is then scraped both with and across the grain with a wire brush to remove the charred surface. The result cannot adequately be described in words, but must be seen to be appreciated. A feature of the display was a cottage, the interior of which was paneled with cypress having this finish. Even the trays and boxes were similarly finished. Through the window in the picture showing this interior may be seen a part of a miniature farm. The exterior of the building and the pergola were of cypress, stained brown.

Another interesting part of this particular exhibit was the section of an old house, the sides and roof of which were covered with cypress shingles. The house was built in 1765 in Maryland, and the original shingles are still on it, though somewhat worn by wind and weather. It was brought to Chicago to prove the lasting qualities of this wood.

Douglas fir made a bid for favor for both interior and exterior use, and a feature was a roof garden surmounted by a pergola. This was the only building with an "upstairs" and the visitor was invited to "come up and look down."

Red gum, another of the new woods, won many friends. For cabinet work, paneling, furniture, etc., it is most pleasing, and compares favorably with walnut, mahogany, or, in fact, any of the best known woods for that purpose.

Redwood serves man in a less conspicuous but no less valuable manner. It is extensively used for water pipes and flumes and in many other ways.

Taken as a whole, it was an educational exhibit of the greatest value and interest to users and possible users of wood. Several columns of space would be required to give a detailed description of the exhibits, and even then it would not afford an adequate idea of their richness and beauty. Words and even photographs are futile.

Among the more elaborate exhibits was that of the Southern Cypress Manufacturers' Association, which had a section of a cypress log with the bark still on, and the sample was claimed to be several thousand years old, yet decay had scarcely touched it. The log was uncovered while digging a canal near New Orleans and was found beneath 15 ft. of silt, and the age of the log was estimated by the depth of the soil that had formed over it. The cypress exhibit was in charge of George E. Watson and C. S. Reynaud.

Gum Manufacturers' Association had an exhibit in charge of J. M. Prichard, of Memphis,

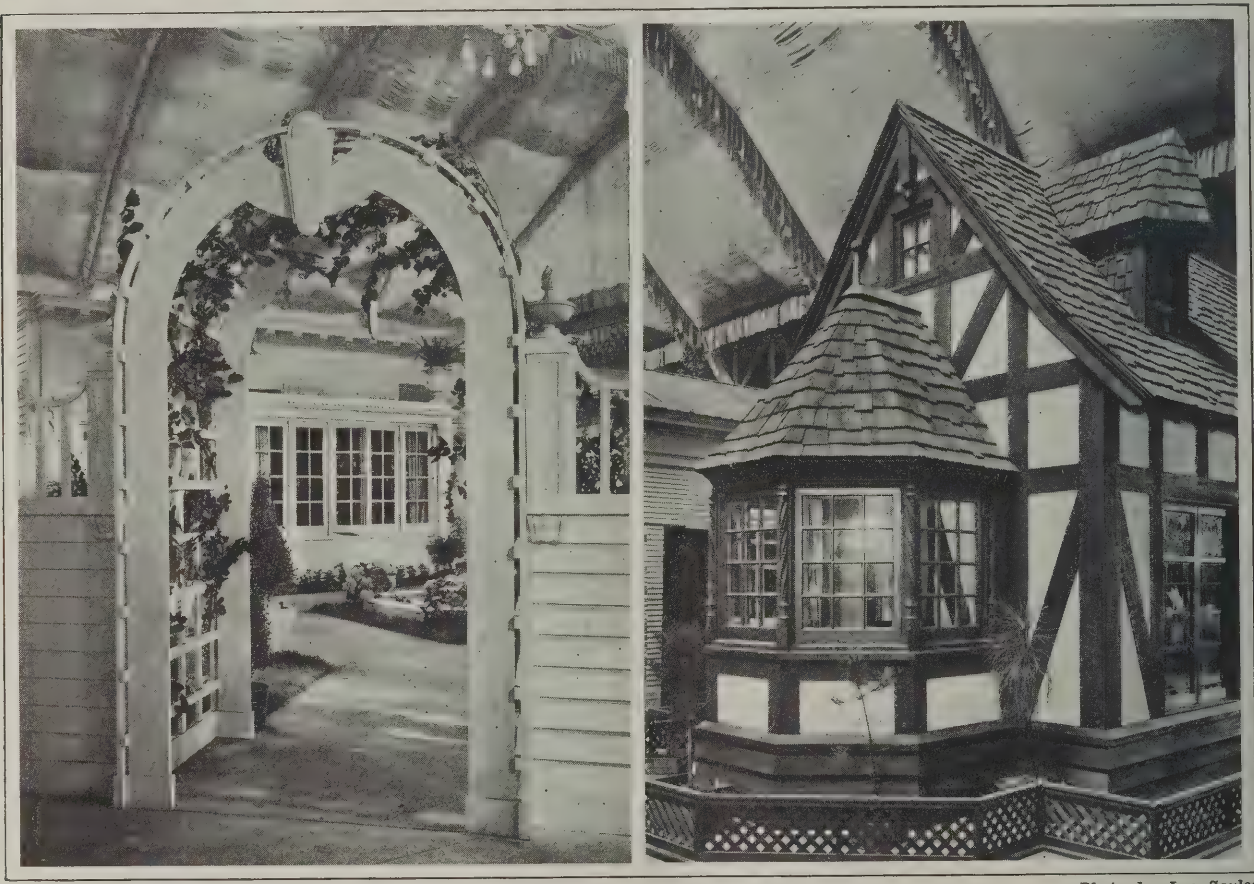


Photo by Lee Saylor

Gateway to the Colonial Garden, Showing the Beautiful Effects Produced by the Use of White Pine

One End of the "Nuremberg Haus," Showing the Possibilities of Yellow Pine for Interior and Exterior Work

The Forest Products Exposition

Tenn., who is secretary of the Association. An interior finished in red gum is pictured among our illustrations. The fireplace was furnished by Charles F. Lorenzen, of Chicago, Ill.

The Oak Manufacturers had an exhibit of a well-appointed room in which interior finish was the leading feature. The exhibit was in charge of W. K. Gibbs, of Chicago, Ill.

Morgan Sash & Door Company, which showed many styles of doors made from a great variety of woods, the selections being made so as to bring out beauty and other valuable features. A view of some of these doors is presented in one of the pictures accompanying this article.

The United States Forestry Service fostered the spirit of conservation with one of its typical exhibits. It occupied one end of the building of the Coliseum and was prepared with the most painstaking care and elaborate attention to detail.

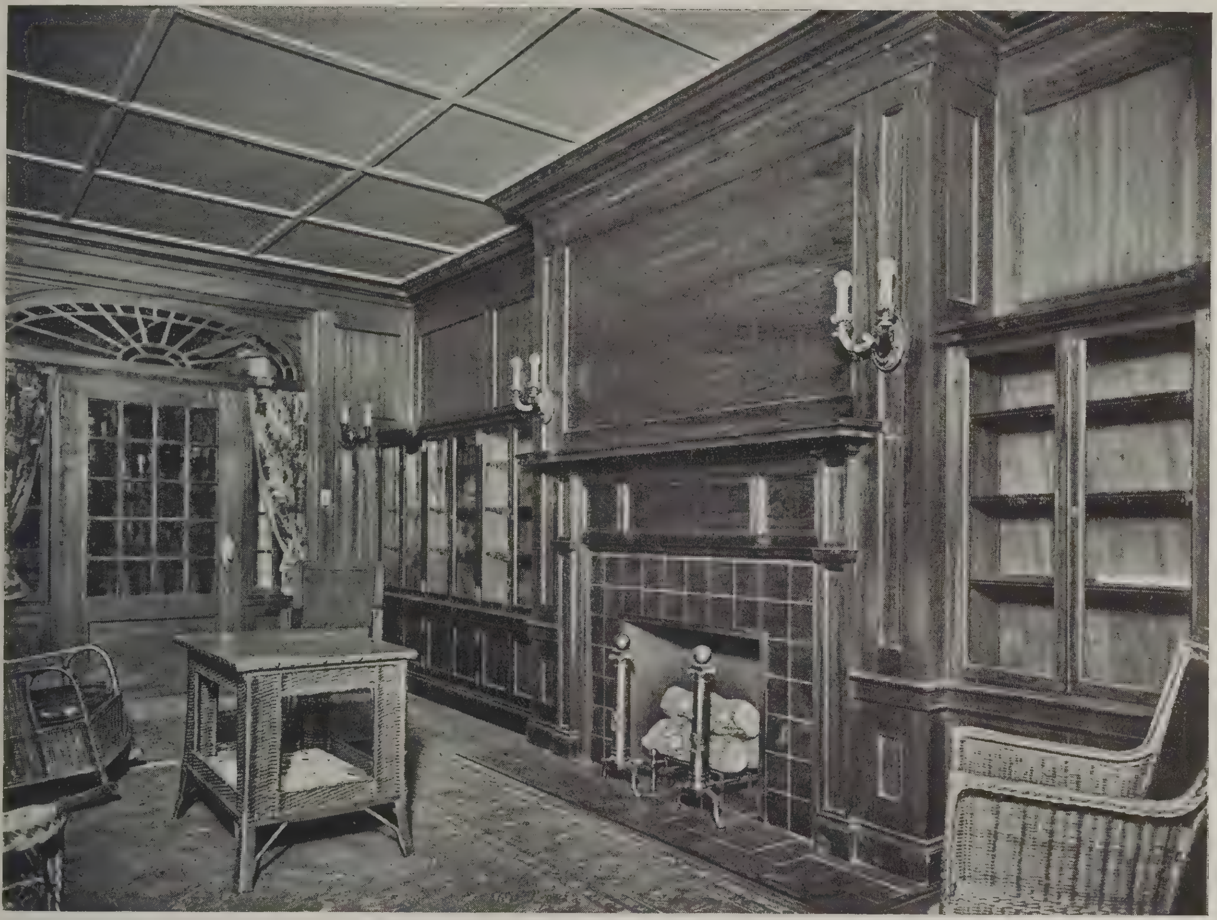


Photo by Lee Saylor

The Forest Products Exposition—An Interior of a Library Handsomely Fnished in Red Gum

Northern Hemlock and Hardwood Manufacturers' Association had an exhibit consisting of bungalow with porch, four rooms and a bath built of eight Michigan and Wisconsin woods which were used in such a way as to show that particular wood as it appears in practical use.

Western Pine Manufacturers Association, the exhibit embracing all grades of western pine and being in charge of George Shields, of Spokane, Wash., who is chief engineer for the association.

Young Men's Christian Association—pictures of Y. M. C. A. buildings in lumber camps, the display being in charge of R. P. Kaighn, of New York.

Other exhibitors included the following:

West Coast Lumber Manufacturers' Association.

Yellow Pine Manufacturers Association.

E. C. Atkins & Co., the well-known saw manufacturers.

North Carolina Pine Association.

Arkansas Soft Pine Association.

American Wood Preservers Association.

American Forestry Association.

American Lumbermen.

American Hoist & Derrick Company; log loaders.

Building Age—the only building journal represented in the Exposition.

Barrett Mfg. Company—wood preservatives, the exhibit being in charge of L. B. Shipley.

Bridgeport Wood Finishing Company—wood finishes, of which it makes a specialty.

Box & Barrel.

Clyde Iron Works—lumbermen's machinery.

Chicago Machinery Exchange—woodworking machinery, with the machines in operation, attracted considerable attention.

Henry Disston & Sons had a booth in charge of J. R. Neely, who was present to meet old friends and distribute literature among new friends.

Franck-Philipson & Co.—veneer.

Hardwood Record.

Hoo-Hoo—a lumbermen's secret society.

Edward Hines Lumber Company.

Lumberman's Association of Chicago.

Louisiana Red Cypress Company.

Michigan Hardware Manufacturers Association.

National Lumber Manufacturers Association.

Lumber World Review.

Lumber Trade Journal.

National Box Manufacturers Association.

Northern White Cedar Association—posts, shingles and piles.

Otis Mfg. Company—mahogany furniture.

John L. Ropes Lumber Company.

Redwood Mill Owners Association.

Southern Lumberman.

H. B. Waite Lumber Company.

Baxter D. Whitney & Son—woodworking machinery.

T. Wilce Company—hardwood flooring, the exhibit being in charge of Alpheus Tucker.

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New York's Latest Private House

One of the noticeable features of building operations in New York City for many years past has been the absence of permits for private houses. Now and then one worthy of note is constructed but most people who formerly lived in mansions of their own now occupy expensive suites in hotels or apartment houses. There have, however, just been filed plans for a palatial private residence which will cost about $350,000 and which will occupy the northwest corner of Park avenue and Sixty-ninth street, fronting half a block on the avenue and 125 ft. on the street. The architectural style is Italian Renaissance with Knoxville marble for the façade. The entrance will be ornamented with four granite columns and four Corinthian ones above the entrance.

On the first floor will be a large dining room with a conservatory, a den and a library. In the hallway will be a fountain. On the second floor will be various bedrooms and dressing rooms and a terrace. On the third floor will be a solarium, three guests rooms and eight bedrooms for servants. The attic will be used for storage. The building will have an elevator and be thoroughly fireproof. The entrance doors will be handsomely designed bronze grille. The architects are Allen & Collens of Boston, Mass., and the house will be erected for Arthur Curtiss James, ex-Commodore of the New York Yacht Club.

◆

Wall Beams in Concrete Structures

In response to modern ideas in lighting efficiency it has become rather common practice to place wall beams above the floor in concrete buildings on account of letting in light clear up to the ceiling line of the story below. The question then arises as to whether these beams shall be cast with the floor or separately. It is generally cheaper and of equally good construction, says Leonard C. Wason, president of the Aberthaw Construction Company, in a paper read before the Boston Society of Civil Engineers, to cast the wall beam as a separate operation, allowing the ends to rest in rabbets in the columns and suspending the slab at the lower edge by means of stirrups.

Provision can be made for continuity by casting some holes in the columns above the floor at the proper points through which reinforcement for negative bending moments will pass, the ends extending well out in the adjacent panels. When properly grouted into place and the panel cast, this will be as strong as if cast as a monolith with the floor.

Photo by Lee Saylor

The Forest Products Exposition—A Handsome Display of "Morgan" Doors Made From Various Woods

Typical Country Plumbing Installations

Overcoming Structural Difficulties in Installing Plumbing in Old Buildings—Making Room for Connections

OCCASIONALLY some difficulty is encountered in the installation of plumbing in old buildings through the primitive type of building construction used. When the joists prove to be of the split log variety and in addition it is necessary to cross them in order to reach the position at which the soil pipe or waste pipe must be placed, some ingenuity must be exercised in order to find a way out of the difficulty.

Such a condition is illustrated in the plan of a bathroom shown in Fig. 1. This bathroom is on the second story of an old farmhouse remodeled for the summer home of a well-known scientist and the joists, while not merely split logs, are axe-hewn and only 6 in. deep. They are, however, 3 in. wide, so make up somewhat in width what they lack in depth. The house is of the usual heavy framed type commonly built about 100 years ago, with framing timbers about 8 x 8 in., upon which the joists of the second floor rest. The only position possible for the soil pipe is in the corner of the bathroom and the desired location of the fixtures is indicated by the dotted lines in Fig. 1.

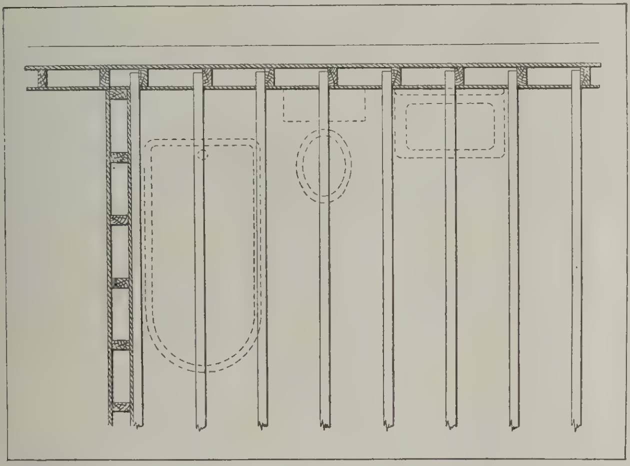

Fig. 1—Plan of Floor Joists in Room Where Fixtures Were Placed, Showing Difficulty in Arranging the Runs of the Various Waste Lines

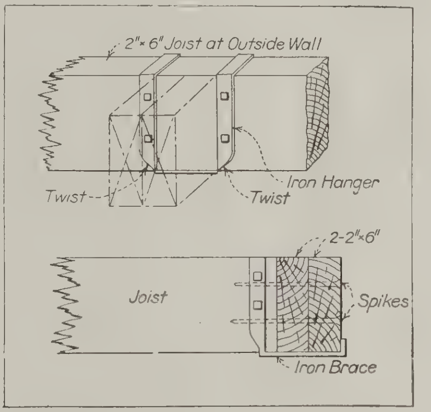

Fig. 2—Iron Hangers Used to Strengthen Header

Typical Country Plumbing Installations

Locating the fixtures in this fashion, as may be seen, required that the soil pipe connection to the water closet should cross three joists. As the room was plastered and it was desired that as little damage as possible be done to the finish, this added somewhat to the difficulty in that it made it imperative to find a way of ventilating the fixtures without carrying the vent pipes in this wall. The room behind the new bathroom, however, was an unimportant one and it was decided to carry the vent pipe through to there and then connect it back into the soil stack in the same room. Thus no pipes were seen in the new bathroom and no plaster, excepting in the corner behind the bath tub, had to be broken.

No carpenter was available to make the structural changes which were required in the floor joists to admit of the fixtures being placed as indicated, and as this was the only feasible location, preparations were made by the plumber for the insertion of a header at a point which would allow the closet to be connected and the bath trap placed without the need of cutting into joists. First of all the ceiling of the first floor was shored up so that when the joists were cut they would not sag unduly. This was accomplished by placing wide boards on the ceiling and floor below and driving vertical posts in so that they wedged tightly between the floor and ceiling boards. Then the joists were cut out, taking great care to remove them gently so that the laths would not be disturbed with consequent breakage of plaster. When these had been removed the header was placed in position.

So as to provide a secure support for the header iron saddles or hangers of the shape shown in Fig. 2 were made and those on the supporting joists placed before the header was put into its place. These were made from bar iron 1¼ in. wide and ¼ in. thick. They were twisted so that they would lie with the flat surface where the header rested in them, and as they turned over the top of the joists they afforded a good support for the header and it was not necessary to depend entirely upon the spikes with which it was fastened to the joists. The header consisted of two 2 x 6-in. joists.

When the header had been laid into its end supports and fastened at each end it was found that the floor sagged a little in the center. No screw jack was at hand to help in this difficulty, but the sagging was corrected by wedging up the timbers on the floor below. Then two large screw eyes were fastened into the joists above and a length of heavy jack chain passed through these screw eyes and over a timber laid on a carpenter's horse, the legs of which were supported on the framing timber at one side and on the whole joists on the other. Then by inserting a pin in the jack chain and twisting it, the sunken joists were readily raised to the right level and the saddles inserted. When the header was finally fixed by spikes driven into the joists the place was ready for the pipes.

It was seen that it would be difficult to vent the closet bend or the bath traps satisfactorily, as it would be necessary to cross the soil pipe to reach the vent pipe, so a drum trap was used for the tub and the closet was left without a vent, trusting to the short branch connection to protect the seal sufficiently. The pipe was carried in 4-in. cast iron pipe to the closet connection, where a reducer was placed in the Y and the rest of the pipe to the lavatory was carried in 1½-in. galvanized wrought iron pipe. Recessed fittings of the drainage type were used. The pipe passed through the wall in the space made by the header so as to avoid the necessity of cutting the first joist beyond it, and then it was offset to the position required, using 45 deg. fittings.

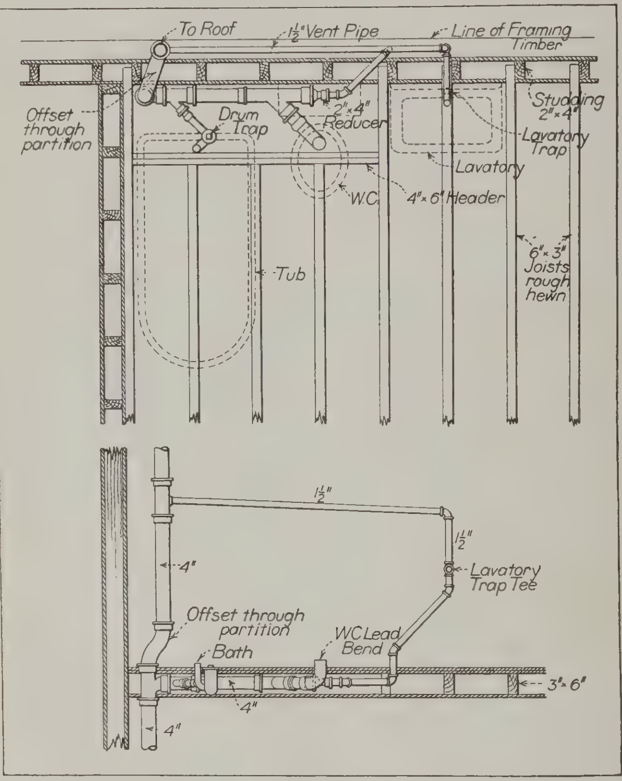

Fig. 3—Plan and Elevation of Bathroom Piping, Showing How the Header Allowed Connections to be Made Without Cutting Into Joints

Typical Country Plumbing Installations

The lavatory connection was made to the vertical pipe by a regular basin tee and then the vent pipe was connected back into the soil stack which had been brought through the wall immediately above the closet branch. The soil stack was carried through the roof in the usual manner, while the soil pipe was connected with the rest of the house drains in the basement. The method of connecting the various fixtures is shown in plan and elevation in Fig. 3. While this method of connecting the fixtures is simple in the extreme and does not provide the vent connections usually called for, it is perfectly good practice in the particular conditions shown, as there are no fixtures above these and no tendency to siphonage or forcing of the seal of any of the traps can be noticed.

Cutting out the joists as is indicated in the plans necessarily means that the laths must support the plaster on the ceiling below without any support between the header and the wall, but as they, in an old building of this type, are generally of the sawn variety and very heavy, they are generally capable of doing this without any noticeable sagging of the ceiling. To relay the floor in the bathroom, however, it is necessary to provide support for the flooring, and this is done by nailing cleats to the framing timbers. It may be necessary to omit some of the rough boards beneath the finish floor where the hubs occur if the joists are only 6 in. deep.

In the job in question the supplies to the fixtures were carried along the baseboard of the bathroom so that no provision had to be made below the floor for the accommodation of hot or cold supply pipes. Had it been necessary, however, it would have been easy enough to have connected these so that they would not be trapped at any place if the supply had come from the basement. In this case the hot and cold pipes were carried in the room behind the bathroom and through the wall to the baseboard, then to the fixtures.

To support the lavatory basin, which was of the deep apron, high back, white enameled variety with concealed hangers, the plaster was cut out behind the place where the lavatory back would be and a heavy board set in and firmly nailed to the studding. The same was done for the support of the water closet tank, and care was taken to proportion these so that no plaster would be cut outside of the line of the fixtures. The soil pipe, where it passed through the room below the bathroom, was boxed in a corner and decorated to be inconspicuous.

◆

Cleaning the Facade of a Skyscraper

Occasion recently arose for cleaning the outside of the Ingells Building in Cincinnati which had become very much soiled in the smoky atmosphere. It was erected 10 years ago and was the first reinforced concrete skyscraper erected in that city. Instead of using a sand blast for the purpose it was found that the dirt gave way more readily to a scrubbing with soap suds and water carrying a little muriatic acid.

◆

The building committee of the San Francisco Board of Supervisors has recently had a request from 22 civil engineers that certain changes be made in the present building regulations. It is suggested that a commission of three engineers be appointed to revise and rearrange in logical order the structural and engineering provisions of the ordinance so that they will conform to modern practice.

◆

The American forestry association has members in every state in the Union, in every province in Canada, and in every civilized and semi-civilized country in the world.

Constructing Concrete Fence Posts

Cost as Compared with Wooden Posts—Fireproof and Durable Qualities—The Mixture to Be Used

By Percy H. Wilson

WHERE cement is easily obtained and proper aggregates are available, which applies practically to the greater part of the United States, farmers are finding it profitable to substitute concrete posts for those of wood. Wooden posts are temporary at best, and in some localities decay within a very few years.

Constructing Concrete Fence Posts—View Showing Braces of Concrete at the Corner Post of the Fence

Concrete posts are indestructible, keep in better alignment than wooden posts, and, under normal conditions, cost little more if as much as the latter. In some sections of the country they can be made cheaper than a good wooden post. Their fireproof and everlasting qualities make them especially desirable. A simple type of post can be easily made on the farm. A farmer may make his own molds, or he can purchase them from one of the various concerns that manufacture molds on a large scale. Farmers sometimes club together in purchasing factory or metal molds, thus reducing expense to the individual. This is a very good plan, as metal molds do not warp or decay.

The easiest and cheapest wooden mold to make is the straight mold, or one for a post which does not taper. Such molds are merely long boxes having various devices for making the molding of the post a simple matter. On account of the amount of lumber saved and the ease with which these molds are filled, straight molds are generally made in "sets" or "gangs," by constructing several side by side with a continuous bottom and end pieces thus adding to the rigidity.

Posts should be reinforced with a rod or wire in each corner. In most cases round bars three-sixteenth or one-fourth inch in diameter are used.

After the molds have been oiled or soaped, the concrete should be placed in them at once. If, for any reason, the concrete stands thirty minutes before using, it should be thrown away and a new batch mixed, for cement, if it has once partially set, makes weak, dangerous concrete, even though it is retempered by turning or adding water. After the molds are filled evenly to the depth of three-fourths of an inch or one inch, according to the spacing of the reinforcing rods or wires, the reinforcement should be laid in, properly spaced by means of at least three "fool-proof" wire spacers. The concrete should then be poured in until the molds are filled within three-fourths of an inch or one inch of the top, when the remaining reinforcement is fitted in place in the manner described above and the molds are completely filled. To render the concrete more compact, a crowbar or a pinch bar should be placed under each corner of the mold successively and moved up and down quickly. This vibration makes the concrete more compact by shaking out the air bubbles, but there will be very few of these bubbles if the concrete is thoroughly mixed and of proper consistency. If desired, the exposed corners of the post may be beveled with an "edger" and the open

A Line of Concrete Posts with Wire Fencing Attached

face given a neat finish by using a trowel immediately after the surface water has been absorbed and before the concrete has become too hard.

The following are exceedingly important precautions:

Do not expose the newly made posts to wind, hot sunshine or frost.

Do not remove the mold from the green post until thoroughly hardened, which generally requires two or three days. Even then the post must remain on the bottom board in the shade and not be disturbed for at least a week. During the first two days keep the post wet and covered with canvas, burlap or other clean material, and dampen it thereafter each day for about a week.

In mixing the concrete, if unscreened "bank-run" gravel is decided upon, it should be used in the proportion of 1 part of cement to 4 parts of gravel. For crushed rock or screened gravel (which is much better than "bank-run" gravel), the concrete should be used in the proportion of 1 part of cement, 2 parts of sand and 4 parts of rock or gravel. All measurements should be made with the material poured loosely into the measuring box, and the box, when full, should be carefully leveled.

◆

Early English Homes

English common people for centuries made their homes in wooden huts of one room. When a family increased in number or wealth another hut was built to it, or rather a leanto was added, and another and another as needs required. Sometimes they followed a straight line, other times they were built out from the central hut at various angles. The roofs of these huts were thatched. In the center was left an opening for the fumes and smoke of the fire to escape. The fire was always built in a hollow in the center of the room.

Beds were straw, often a shakedown in a corner. Occasionally the straw was held in a frame like the ribs of a ship.

Houses built by Saxon knights were much more pretentious. They were big halls, like the Roman atrium, with a lofty roof thatched with slate or wood shingles. The floor was hard clay. In the middle was a great fire of dry wood. The thin, acrid smoke from the fire escaped through an opening in the roof directly above the hearth.

Around the fire were long benches on which hearthsmen and visitors sat when not fighting or at work and talked and drank the hours through. The tables were long boards on trestles. At night, like the less prosperous folks, the floor was strewn with straw and host and visitors slept together.

◆

The Abuse of Plumbing Fixtures

All too often the plumbing manufacturer is blamed, and claims are made for defective material when conditions such as are set forth are responsible for the damage, says a writer in the *Architect and Engineer*. This letter is from a manufacturer's representative:

"The other day I was called in to look at a couple of tubs installed in a very fine apartment building. In this job were twenty-six (26) high-grade tubs. I was surprised to see the condition of the fixtures generally, as the tubs were most all covered with lime and mortar left by the plasterers and tile setters. On at least three of the tubs it was almost impossible to see any enamel, and I am of the opinion that when this debris is removed the surface will be affected.

"The lavatories are also in very bad shape, as most of them show where the painters have cleaned their brushes on them. I took this subject up with the plumber, and he stated that after he set each fixture he covered both tubs and wash stands with paper, but that the plasterers, carpenters, painters and other tradesmen on the job removed the covering. It is my opinion that a more substantial covering should have been used; one that would have required more effort to remove, such as a tarpaulin or canvas covering. Paper is not sufficiently strong and too easily removed to be of any real value for this use. I next took the matter up with the general contractor and pointed out to him the shame of abusing bath room fixtures in this manner, and he stated that it was something beyond his control, and was up to the individual or sub-contractors.

"I have no doubt but what more care will be taken on future jobs by the people whom I talked to in this particular case, but to take up each individual contract and attempt to guard against this abuse is something out of the question.

"On the same job I was walking over a hard-wood floor and was cautioned by the man laying it to walk on my toes and not with the heels of my shoes, yet apparently no care was thought to be taken about porcelain enameled lavatories and bath tubs."

This case was clearly one where the plumbing fixtures were installed before they should have been. The plastering and all similar work should have been completed before the fixtures were even taken to the job, and there would have been no possibility of such damage being done.

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Painting a New House

To-day most lumber is kiln dried. This means that seasoning has been artificially forced. The pores of the wood are open and will soak up moisture. Besides it contains all the salts and acids of the wood in concentrated form, which, if not removed in some way, will prove detrimental to the durability of the paint. For this reason, it is generally thought advisable to allow a new building to stand for a month or two unpainted, says a writer in *Varnish Talks*, so as to permit washing out of the surface cells, and allow for the closing of the pores which have been unnaturally opened. Then, after a dry spell, which will remove any moisture absorbed by the wood, is the ideal time to apply the priming coat.

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When a Sign Is a "Building"

According to a recent decision of the New York Supreme Court a sign is a "building" to all intents and purposes when it is guilty of blotting out or obscuring the public view. The suit in question grew out of the erection of a large metal electric sign on a building at the intersection of Broadway, 47th Street and Seventh Avenue, New York City. According to the terms of the agreement, the lease of the building of the plaintiff was to be terminated if a "building" was erected south of its property high enough to hide the view from the latter. A sign was put up which, it was alleged, obscured the view, and the defendant contended that this constituted the "building" mentioned in the lease. The court decided in favor of this contention.

San Francisco Building Material Market

The building material trade has improved during the spring, but is still far short of expectations, says our San Francisco correspondent, writing under date of May 6. The principal change within the last month has been the increase of deliveries on old contracts in some of the heavier lines, but new business is very slow in appearing, and there is some complaint from dealers in all lines.

The great bulk of the Exposition work has been done, without putting any strain whatever on local contractors or dealers; in fact, during the most active period of Exposition work business has been rather quiet. "Oregon pine" or Douglas fir lumber has been the principal material used, and the requirements have been met without tangible effect on the market. One more order will complete the lumber purchases for the main exhibit buildings.

Prices have lately advanced a little in the local retail lumber market, though some price-cutting is reported in nearby towns. The State, foreign and concession buildings of the Exposition, which are now under way, are distributing their lumber business among the local yards, giving some life to an otherwise dull market. Mill prices for northern fir, however, are still badly depressed, with a large output and little business from the largest consumers. California redwood is having something of a boom, as the export business is very heavy, and eastern shipments are fair, though the lower grades are hardly as strong as they were, being dependent on the local market for an outlet.

Fabricators of structural steel are busier than for some months past, but most of their work has been taken at very low prices, and little new business is definitely in sight. German fabricators are figuring on entering this market, but have made no progress as yet. Reinforcing steel is cheap, and local mills have curtailed output. Jobbing prices on pipe, nails, and many other steel products have been demoralized, though there is a fair demand.

Common brick prices remain at $6.50 per M. The outlook is good, as the output will probably be less than in recent years, and the leading manufacturers have contracts covering most of their year's output, deliveries on which are coming forward rapidly. Other clay products show increasing activity, with a number of good contracts for pressed brick, terra cotta, polychrome work, etc., but the movement is below expectations.

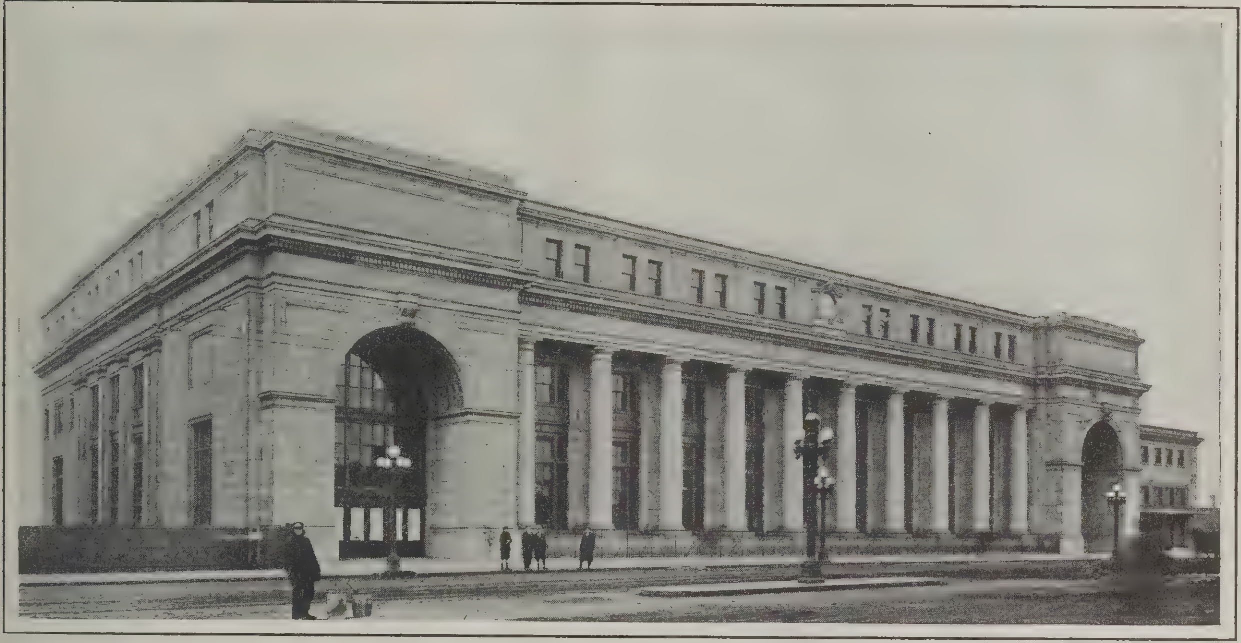
San Francisco men who control the output of mills in Oregon and Washington, as well as redwood manufacturers, express confidence that they will derive considerable benefit from the Panama Canal, which, according to all reports, will be opened this summer.

A Handsome Railroad Station

There are many features of interest to the architect and builder in connection with the handsome passenger station which we illustrate herewith and which has just been completed at Minneapolis, Minn., for the Great Northern Railway Company. The exterior is Tooled Kettle River sandstone and the only wood used in construction was in the doors and narrow casings. The entrance and inner vestibule floors are of art marble tile and the walls are wainscoted with Tennessee marble. The door frames and booths around the waiting room are of ornamental cast iron. The smoking room has DeSmet marble cement floor tile with Tennessee marble wainscoting and the dining room on the second floor has a marble tile floor with a Vermont marble wainscoting.

A portion of the building is roofed with shingle tile and the remainder has a composition roofing. All gutters are of copper.

One of the novel features in connection with this building is the system of ventilation. Water-washed air is poured into the waiting room by means of enormous fans, while at the same time the vitiated air is removed by means of exhaust fans and the temperature maintained at a uniform degree. During the summer the air, cooled to a refreshing temperature by ice, will be pumped into



New Passenger Station at Minneapolis, Minn., for the Great Northern Railway Company the station at the rate of 35,000 ft. per minute.

The main waiting room and train concourse are lighted by large ornamental chandeliers with Tungsten units. In the new station Minneapolis people are given their first sight of recessed lights at the base of all stairway landings, thus minimizing missteps in going down these stairways.

This new station, which cost $2,000,000, stands on the river front facing Hennepin avenue, and has a waiting room 62 x 155 ft. and a concourse 252 x 50 ft. on the street level, with stairways and elevators leading to train platforms.

There is an over-head trucking gallery for handling baggage, both mail and express, with elevators leading to all platforms at the far end of the station so that baggage trucks are never in the way of passengers.

The electrical equipment is said to be the finest in the northwest, and in connection with the station more than 11 miles of galvanized iron conduit were used and more than 25 miles of rubber-covered wire. More than 500 switches are used for controlling the various lighting circuits, in addition to which there are a number of remote control switches regulating groups of lights from various remote locations in the station.

The architect was Chas. S. Frost, 105 La Salle street, Chicago, Ill., and the general contractors were the C. W. Gindele Co., of Minneapolis, Minn.

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Making the Trade School Efficient

One of the questions which developed a most interesting discussion at the seventh annual convention of the National Society for the Promotion of Industrial Education held in Grand Rapids, Mich., was that indicated by the title "How Schools Can Best Meet Needs of Trade Workers."

The discussion was led by Wesley A. O'Leary, director of the Evening Training Classes for Trade Workers at Pratt Institute, Brooklyn, N. Y., who took the position that the only way in which the mechanic could be reached effectively by evening school instruction was by the use of the short or brief "unit" course. He held that this was equally necessary in dealing with boys of part-time education. Among other things he said:

"The work should be organized in the form of short unit courses; the course should be long enough to meet the needs of the worker; efficiency of course is independent of the length. The short unit course is an intensified form of instruction which is intended to serve in a limited number of lessons a specific need of a particular group. Each unit deals with one teachable phase of the trade and is complete in itself. The subject matter is selected with reference to the need of the group and not with reference to its relation to other parts of the trade. For example, the usual course in shop mathematics admits to the class carpenters, machinists, plumbers and any one else who wants the subject; it begins with arithmetic, and puts up a series of topics progressively arranged, ending, perhaps, with elementary trigonometry; the course extends over several terms and the subject is taught with reference to its general application to shopwork.

"Under the unit system separate courses would be organized for each of these trades, each course designed to meet the peculiar mathematical need of a distinct group.

"The best evening industrial schools should contain the following features:

"A preliminary study to determine the needs of the industry. The teacher in every case should have had practical experience in the trade; he should have teaching ability and he should be acceptable both to the employer and the employees. The assistance of practical men should be obtained in such matters as securing proper quarters, selecting qualified instructors, passing upon the value of proposed courses, finding out the needs of the industry. Lantern talks and addresses before various organizations, including trades unions, on the work of the school, should be given at every opportunity.

"There should be a preliminary registration during the first week of the session. At this time the school finds out in detail the specific needs of each pupil. The pupil should be admitted to the school on trial on the basis of his experience and should be at work in the trade in which he wants instruction.

"Efforts should be made to obtain the co-operation of the employer. The best way to do this is to efficiently train the employees.

"The part-time industrial or trade school is a school operated during the day where the pupil who has already become a wage-earner is drawn out of the industry for a part of his working time for the purpose of increasing his efficiency in the occupation or trade he is following or for preparation for another. The weakness in the customary method of organizing the classroom work in the part-time school is that it does not admit of effective correlation between shop experience and classroom work.

"To give efficient industrial training requires a close interweaving of practice and theory. Correlation is difficult. The school cannot control the work of the shop. The shop of the part-time school, like any other commercial shop, must take its work as it comes. The character and quantity of the work depends entirely upon its business. The extreme specialization in large shops and factories, and even in many skilled industries, has tended more and more to make the usual workman a machine hand.

"To give such a wage-worker the range of training necessary to make him a competent all-round workman it is becoming increasingly clear that the part-time school must supplement the narrow opportunity which the commercial shop affords, by giving additional instruction in shop practice at new machines. It is very doubtful whether a part-time class organized on other than a short unit course basis will meet the needs of the specialized machine hand."

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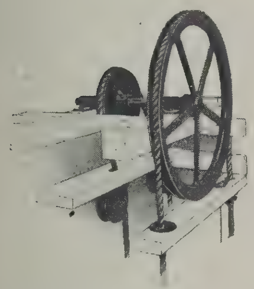
Augustine Sackett, the inventor of what is now so familiarly known in the trade as Sackett's Plaster Board and who was the founder of the Sackett Plaster Board Company, 1170 Broadway, died early in May at his home, 1219 Madison Avenue, New York City. He was born in March, 1840, on a farm near Warren, Conn., which was purchased by his ancestors from the Indians in Colonial days. He graduated from Phillips Academy, Andover, and after the Civil War engaged in business in New York, being very successful with the plaster board. He retired from active business some five years ago.

The Evolution of the Dumb Waiter

Mechanical Development and Improvement of Details Which Have Enabled Dumb Waiters to Meet Modern Requirements

By J. I. Wakelee*



THERE has been no conspicuous development nor radical change in dumb waiters for private and apartment house work during the past two decades. And yet within that time there has been a radical change in sentiment among architects, builders, and owners on the subject of dumb waiters. Twenty years ago elevator apartments and skyscrapers were attracting the consideration of builders, and as the comparatively crude hand-power dumb waiters of those days could not possibly meet the demands of modern high buildings, the general impression was that electric dumb waiters would have to be used.

An investigation now, however, demonstrates that the use of electric dumb waiters even in apartment buildings of from ten to fifteen stories is comparatively rare, and that to-day hand-power dumb waiters are giving fully as good results in these many-storied apartments as are electric dumb waiters.

Electric Dumb Waiters

It is realized that electric dumb waiters cost several times as much as do hand-power dumb waiters, and that the expense of maintenance is also many times that of hand-power dumb waiters.

On the other hand, it is now realized that the installation of the high-priced electric dumb waiters does not benefit the builder, the owner, nor the tenant. If there be any benefit it goes to the butcher's boy, or the baker's boy, or the milkman, as it merely saves the delivery boy the effort required in operating the hand-power dumb waiter.

Of course, the dumb waiters which were used twenty years ago would not have answered at all, and doubtless there are dumb waiters built to-day which are no better than those built twenty years ago, but, on the other hand, there are dumb waiters which in ease of operation, speed of travel, durability and reliability, would be a revelation to one familiar only with the dumb waiters of a quarter of a century ago.

Improvements in Dumb Waiters

The improvement in dumb waiters which has enabled them to meet modern requirements, as before stated, has not consisted in any remarkably new invention, but has consisted in the mechanical development and improvement of details.

The dumb waiter car is still most frequently made of wood, but the wood is selected ash, seasoned three years under sheds in the air and then kiln dried before being worked. The sides and sills are bolted together, and the result is a strong, light car, which can hardly be improved upon for the purpose for which it is used.

The machines are as carefully designed and the materials selected after as careful testing as are the materials for a modern high-class automobile. The bearings are all fitted with steel anti-friction rollers, the automatic brakes are wonderfully simple and effectual devices, and should receive more than a passing word.

The Modern Automatic Brake

The perfection of the modern automatic brake as applied to dumb waiters is possibly the one thing which more than anything else has made the modern dumb waiter the reliable and satisfactory convenience which it is. There are a number of devices in the market, some dependent upon springs, and some upon ratchets, and some upon other devices of a temporary nature, but the standard machine to-day is a "full automatic machine," by which is meant that the machine is automatically controlled by the brake in both directions, so that the empty car cannot travel upward of itself, even if the counterweight be much heavier than the car; neither, of course, can the loaded car descend of itself. An endless hand rope is used and the operator pulling down on the rope at one side of the door opening raises the car, pulling down on the hand rope at the opposite side of the door opening lowers the car, and when the operator stops moving the hand rope or lets go of it, the automatic brake comes into action and gently but firmly stops and holds the outfit. The brake plate itself is of the best quality of phosphor bronze and the other parts are of those materials which test and experience have proven to be best adapted to the work and most reliable and durable.

Outfits Made by Specialists

The past twenty years have seen a very general departure from the practice of the local carpenter making his own dumb waiters, for at the present day dumb waiter outfits are manufactured by specialists who make nothing else, in plants erected and equipped with modern machinery and the wise builder buys not the machine alone, but the complete outfit consisting of the machine, the car, the counterweight, the guide runs and the ropes.

With the outfit he gets drawings and full directions for erecting and if his conditions or requirements are in any respect out of the ordinary he so informs the manufacturing specialist and thus secures an outfit which has been not only built but designed to meet the special requirements and which gives perfect satisfaction in every respect, for if it does not there is no divided responsibility; the manufacturer alone is responsible.

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*President Sedgwick Machine Works.

It is really merely a matter of detail and the specialist has worked out these details.

Taking the mere matter of ropes for instance: if a carpenter went to a good hardware store and paid a good price for a good piece of rope, what more can he do? As a matter of fact, not one hardware store in ten thousand keeps ropes suitable for dumb waiter work. The dumb waiter manufacturer, on the other hand, has all of his ropes made specially for the purpose. His hand ropes are made from selected Russian or Italian hemp because Russian hemp fiber and the Italian hemp fiber are so fine that it will not prick and irritate the skin. The weight rope is made of selected, pure, long-fiber Manila. Such rope costs more than ordinary Manila rope, but is the only kind that is worth using to carry the dumb waiter car.

This matter of specialization is so thoroughly appreciated today that most manufacturers of power elevators either refuse to accept contracts either for hand power elevators or dumb waiters, or if they do include in their contracts hand-power elevators and dumb waiters as well, they secure the hand-power elevators and dumb waiters from manufacturers specializing in that line.

Complete dumb waiter outfits and complete hand-power elevator outfits are carried in stock in standard catalog sizes by the manufacturer so that orders for such standard sizes can usually be filled in a comparatively few hours, and special sizes where they are required to meet special conditions are furnished within a few days, so that while it is wise for the builder to place his order in ample time, there is no excuse for his using a hand-made "contraption" on the ground that he could not wait to get a real dumb waiter from a reliable maker.

Commencement Exercises of the New York Trade School

The thirty-third annual commencement exercises of the New York Trade School were observed with appropriate ceremonies on the evening of April 1 in the assembly hall, 67th street and First avenue. In accordance with usual custom President R. Fulton Cutting made some very interesting remarks in which he congratulated the graduating class on the progress that had been made in workmanship but cautioned them against thinking that they knew it all. He pointed out the value of establishing a good reputation for industry, reliability and honesty, and called attention to the fact that during periods of depression it is the man of bad habits who is first dropped from the payroll, then the inferior workman follows, while the first-class mechanic who takes care of himself, performs an honest day's work and evinces a strong pride in properly performing his labors is the one who will remain steadily at work. The commencement address was delivered by the Hon. Frank Moss, formerly first assistant to District Attorney Whitman of New York County, who made a strong and eloquent appeal to the young men about to go into the world of workers. In the speaker's experience he had known of many, many young men who, had they been taught to do some kind of work well, would have avoided serious trouble. "Do not look," he said, "upon a life of ease as one of the things to be desired. True happiness lies only in hard work, the satisfaction of work well done, and consideration of and helpfulness to your fellow-man. A man whose hand has been trained to engage in any of the highly skilled handicrafts has the first element for success. If his mind has been trained so that he understands the theory of his trade he has another of the required elements for success. Next is to put your heart into your work with a never-say-die spirit, and the chances are you will win success, possess the respect of your fellow-citizens and be a credit to your city."

The list of graduates in the various classes included 5 in carpentry; 74 in plumbing; 33 in electrical work; 16 in cornice and skylight work and sheet metal pattern drafting; 8 in steam and hot water fitting; 4 in bricklaying; 2 in sign painting and 1 each in plastering and pattern making.

The set of technical books donated by a former graduate of the carpentry class for competition among carpentry students was won by Thomas Toner, of Burlington, Vt., while the gold medal donated by the New York Master Plumbers' Association, was awarded to Harry T. Miller, of Lakeville, Conn.

Including the two already mentioned the honor roll students were Henry Unwin, of Newark, N. J., in the bricklaying class; Gerald A. Close, of Portland, Me.; Peter P. Braun, Lancaster, Pa.; Charles C. Fish, Chapinville, Conn.; Clarence I. Rifleman, Wausau, Wis.; George Spiegel, Clintonville, Wis., and Louis Dutka, New York City, in the class in electrical work; and E. L. Pilling, Stockbridge, Mass.; William E. Folsom, Taunton, Mass.; C. R. Moulton, Lewiston, Me.; Jack Eberlin, York, Pa.; Emery V. Simpson, Fairfield, Ill.; F. J. Pritchard, Rockville, Conn., and James P. Morgan, Jr., Hudson, N. Y., in the plumbing class.

After the honor rolls had been presented to the winners the exercises were concluded by the audience singing "America," after which the students conducted their friends through the various workshops where interesting examples of work turned out by the students were on exhibition.

Varnishing a Floor

A man I knew decided it was hardly worth while to hire a professional to do so simple a thing as varnish a floor, so he bought a brush and a can of varnish, which he took home after his day's work was done, with the intention of applying it to the floor. Two or three hours later he called his wife to witness the artistic triumph.

"How does it look?" he asked.

"Fine," she replied, sniffing the air. "Fine! And a novel idea. How did you happen to think of it?"

"Wh—What-What's that?" he asked.

"Why didn't you use varnish?"

"Why—what—I did use varnish."

"Oh, no," said his wife, "you got hold of the wrong can. This is maple syrup."—*Sterling Spirit.*

Current News of Builders Exchanges

Various Happenings of Interest to Members of Exchanges in All Parts of the Country

Detroit Builders and Traders Exchange

The fourth annual "outing" for members of the Exchange and their friends will this year be held at "Bob-Lo" Park on "Bob-Lo" Island on Tuesday, June 16. A special boat has been chartered for the private use of the members and the usual program of fun and frolic will be had.

The bowling leagues of the Builders and Traders Exchange ended their season toward the close of March, although several post-season games were played to decide ties and settle some arguments as to which were the best teams. What was known as the Corrick team, composed of John Corrick, captain, Fred Galster, Howard Rothermel and William A. Brown, won the championship of the first league. Following the championship games the Metzger team challenged the Corricks for a match which was won by the latter.

The last issue of the "Bi-Monthly Magazine" of the Exchange contains a great deal of interesting matter relative to organization, one of the features being copious extracts from the address delivered before a gathering of those interested in the subject by Leslie H. Allen, of Boston, on "Quantity System in Estimating." Among those present were representatives of the Builders and Traders Exchange; of the Michigan Chapter of the American Institute of Architects, and of the Detroit Association of Engineers.

The Atlanta Builders Exchange

We learn from Secretary J. D. Wood that beginning with the 2d of May the Weekly Bulletin heretofore sent out by the Builders Exchange of Atlanta is being printed in the "Building Review," a weekly organ published by the Contractors and Dealers Exchange of New Orleans, La. One full page is devoted to the Atlanta Builders Exchange and the information given is along the same line as has appeared in its Bulletin in the past, which includes list of plans on file, building permits and news items relating to the building situation in Atlanta and vicinity.

Pittsburgh Builders Exchange

At a recent meeting of the Board of Directors of the Builders Exchange of Pittsburgh held at their headquarters, 207 Fulton Building, 15 new members were elected to the organization. At this gathering George T. Heppenstall, who attended a meeting of a committee to discuss industrial accidents and the workmen's compensation bill, made an interesting report of his observations.

The Exchange is in a flourishing condition and has recently added another room containing 1000 ft. of floor space which will be given over entirely to the use of desks for members. This permits of the addition of 12 new desks, making 25 in all.

Meeting of Birmingham Exchange

At the regular meting of the Builders Exchange of Birmingham, Ala., held on Monday, April 13, in the Exchange Hall, several very interesting talks were given on topics of all absorbing interest to the members of the building fraternity. Preliminary to the remarks a buffet luncheon was served.

Hon. Thomas J. Judge, newly elected senator, discoursed instructively on "Lien Laws"; the Hon. E. P. Hogan, newly elected to the legislature, spoke on "Compulsory Education," and the Hon. Isadore Shapiro, another newly elected member of the legislature, spoke on the "Wage Earners' Compensation Act."

A Builders Exchange at Green Bay, Wis.

A movement is on foot looking to the establishment of a Builders Exchange at Green Bay, Wis. Suitable rooms are being secured and it is the intention to have architects place plans of contemplated work on file so that the contractors may figure upon them. A directory is to be published and copies sent to architects throughout the state. A committee to arbitrate differences that will arise between contractors and employees will be selected by the president. The movement grew out of a recent meeting of the Brown County Contractors and Builders Association, of which George F. Reeke is president.

Annual Meeting Lowell Builders Exchange

The annual business meeting and banquet of the Builders Exchange of Lowell, Mass., was held April 17 at its headquarters in the Sun Building. Secretary A. H. Weaver presented a very interesting report covering the work of the organization during the past year. The officers elected were as follows:

President	Patrick O'Hearn
Vice-president	Nelson D. Keables
Secretary	Alvah H. Weaver

In the evening the annual banquet was held at the Richardson Hotel, President O'Hearn acting as toastmaster. Among the speakers of the evening were the Mayor of the city and Congressman J. J. Rogers.

Chicago Exchange Holds "Boosters" Meeting

With the object of creating a greater enthusiasm among the members to increase the membership and to stimulate their activity in public affairs of interest to the exchange, the membership committee of the Chicago Builders' & Traders' Exchange recently entertained sixty members in the rooms of the Exchange. Several speakers addressed the meeting, and spoke of the excellent work the exchange has accomplished since its inception. C. W. Jones was chairman for the evening and O. W. Jovien, F. F. French, John Rawle and S. Shoemaker were some of the principal speakers. E. M. Craig, secretary of the Building Construction Employers Association, gave a forceful talk on the progressive work done by his association, and outlined the benefits that could be derived by members interesting themselves in the larger projects of the city of Chicago. Refreshments were served during the evening and the occasion was a most enjoyable and educative gathering.

The Chamber of Commerce in which the exchange is housed will shortly have new neighbors in the Carpenters' Association of Chicago and the Chicago Masons' and Builders' Association. When these organizations occupy their new quarters all organizations of building trades' contractors, except the plasterers, will then have offices in that building.

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A building exchange has just been organized at Wheeling, W. Va., through the active efforts of Joseph A. Weldon and E. M. Tate, secretary of the Builders Exchange of Pittsburgh, Pa.

Brief Review of the Building Situation

Figures Showing Building Activities in Leading Centres Based on Permits Issued in April, 1914, and April, 1913

THE depression which is being felt in important industries throughout the country at the present time is rather forcibly reflected in the reports of building operations which reach us from 115 cities. April is generally regarded as one of the most active months of the year so far as building projects are concerned, but the figures at hand show that this year is 15½ per cent. behind April, 1913. Many of the important cities show heavily decreased activity and it is only in the smaller places where dwelling house construction and the erection of small business buildings are on a scale that brings about an increase over a year ago. Out of the 115 cities reporting 58 record a decrease, and 47 an increase.

As a matter of convenience we have divided the country geographically into four sections and in the tables which follow is indicated the new work for which permits were issued during the two periods named. There are 21 of the eastern cities showing a loss as compared with April last year and 17 a gain, the net result being a loss of 5.9 per cent.

CITIES IN EASTERN STATES

	1914		1913	
Albany	450	1,156,595	351	480,100
Allentown, Pa.	115	465,370	98	327,200
Altoona, Pa.	118	130,107	145	156,889
Boston	546	5,471,000	442	6,160,000
Brockton, Mass.	..	71,397	..	71,420
Buffalo	..	1,280,000	..	1,097,000
East Orange	..	541,272	..	168,304
Elizabeth, N. J.	58	193,774	60	170,356
Erie	252	399,183	240	628,142
Hartford	..	447,143	..	378,520
Hoboken	22	105,273	22	59,839
Holyoke	31	219,097	20	107,960
Jersey City	137	301,349	135	623,879
Lawrence, Mass.	39	190,960	44	187,740
Manchester, N. H.	118	113,421	139	352,352
Newark	234	754,142	357	1,842,278
New Bedford, Mass.	141	392,150	123	246,350
New Haven	116	249,485	133	399,935
New York:				
Manhattan	526	5,447,463	452	7,470,358
Bronx	..	1,938,742	..	2,892,281
Brooklyn	..	5,230,120	..	3,761,461
Queens	..	2,649,221	..	1,769,884
Passaic	65	239,982	46	88,690
Paterson	..	293,448	..	149,785
Philadelphia	1062	3,075,905	..	3,689,615
Pittsburgh	390	1,158,225	395	1,057,762
Portland, Me.	40	85,000	73	268,689
Reading	63	87,200	58	117,375
Rochester	454	1,156,109	456	1,222,773
Scranton	..	157,383	..	113,390
Schenectady	105	191,812	115	363,971
Springfield, Mass.	169	450,460	179	508,000
Syracuse	283	483,780	..	609,295
Trenton, N. J.	85	305,906	99	232,602
Troy, N. Y.	..	37,333	..	44,274
Utica, N. Y.	73	277,005	104	277,750
Wilkes Barre	85	86,194	85	132,369
Worcester	196	485,174	194	493,059

In the next geographical division covering important cities in the middle states there is a loss of practically 11¼ per cent., there being 18 cities showing a loss and 14 a gain. Prominent among the former are Chicago, Indianapolis, Akron, Kansas City, Milwaukee and Minneapolis, while those showing increased activity include Cleveland, Detroit, Cincinnati, Dayton, Duluth, Fort Wayne, Omaha, St. Louis, St. Paul and Youngstown.

CITIES IN THE MIDDLE STATES

	1914		1913	
Akron	319	659,030	314	1,119,380
Cedar Rapids	47	237,700	30	168,000
Chicago	..	9,465,800	..	12,237,550
Cincinnati	1506	964,423	1248	693,205
Cleveland	1568	2,594,113	1348	1,880,065
Columbus	375	683,555	1046	774,121
Davenport	116	255,648	55	321,200
Dayton	142	421,300	13	18,200
Des Moines	..	181,178	84	265,835
Detroit	..	3,117,620	..	3,070,195
Duluth	210	440,491	164	280,345

CITIES IN THE MIDDLE STATES (Continued)

	1914		1913	
East St. Louis, Ill.	57	78,745	37	39,972
Evansville	164	179,717	143	448,406
Fort Wayne	148	388,550	103	222,150
Grand Rapids	183	135,934	210	355,776
Indianapolis	764	1,036,716	661	1,531,060
Kansas City, Mo.	354	735,665	512	1,265,745
Lincoln	..	172,540	..	623,085
Milwaukee	552	1,353,040	641	1,798,110
Minneapolis	890	1,912,290	542	2,093,915
Omaha	154	593,035	110	575,085
Peoria	74	202,650	75	263,101
Saginaw	64	93,585	40	89,085
St. Joseph	..	54,230	..	118,092
St. Louis	..	1,734,412	..	1,586,006
St. Paul	374	1,204,759	342	926,150
Sioux City	..	317,837	..	302,983
South Bend	..	158,105	..	198,127
Springfield, Ill.	56	79,015	78	115,260
Toledo	338	772,144	304	885,315
Topeka	43	69,875	68	100,236
Youngstown	160	470,035	123	286,619

In the southern states the falling off as compared with April last year is 21½ per cent., there being 11 cities out of 20 showing decreased activity. The marked declines are found in Baltimore, Dallas, Texas; Nashville and Washington, D. C., while increased activity is reported from Atlanta, Birmingham, Chattanooga, Memphis, Richmond, San Antonio and Shreveport.

CITIES IN THE SOUTHERN STATES

	1914		1913	
Atlanta	335	629,844	366	429,805
Baltimore	412	635,215	371	1,626,014
Beaumont, Tex.	62	51,799	..	36,704
Birmingham	..	318,144	..	296,235
Chattanooga	207	219,490	235	117,900
Columbia, S. C.	..	56,090	..	28,058
Dallas, Tex.	..	565,335	..	1,211,535
Louisville	298	451,820	312	510,690
Memphis	288	420,085	375	285,929
Miami, Fla.	..	43,950	..	47,750
Nashville	101	258,505	55	427,366
New Orleans	..	218,350	..	251,734
Norfolk	68	306,182	91	478,456
Richmond, Va.	142	557,131	139	495,141
San Antonio	..	324,760	..	156,155
Savannah	47	45,360	47	120,350
Shreveport	..	160,668	..	156,907
Tampa, Fla.	152	125,280	142	140,874
Washington, D. C.	..	851,309	..	1,162,656
Wilmington	..	286,056	..	335,024

Coming now to leading cities of the country west of the Dakotas, Kansas and Nebraska, there is shown a decrease of 47½ per cent. in April as compared with the same month a year ago. This largely grows out of the heavy falling off in building operations in Los Angeles, Portland, Ore., and San Francisco, while there is also more or less of a shrinkage in Oakland, San Diego, Denver and Pasadena. Cities showing increases embrace Salt Lake City, Seattle, Spokane, Berkeley, Cal., and San Jose.

CITIES IN WESTERN STATES

	1914		1913	
Berkeley, Cal.	118	303,950	83	236,900
Colorado Springs	34	60,000	30	18,925
Denver	..	225,403	..	242,300
Los Angeles	1013	1,898,304	1707	5,047,065
Oakland	300	405,540	343	635,176
Pasadena	145	156,455	158	206,904
Portland, Ore.	605	769,500	703	2,887,885
Pueblo	27	30,925	23	15,300
Salt Lake City	..	321,200	..	277,151
San Diego	203	240,805	342	776,850
San Francisco	552	1,707,064	509	3,152,020
San Jose	54	83,094	57	53,313
Seattle	936	1,227,930	948	840,595
Spokane	..	214,610	..	198,363
Tacoma	147	105,303	180	160,759

For the first four months of the year the showing is very much better as the loss for the country is only about 5 per cent. Eliminating a few of the large cities that show heavy decreases and the figures indicate an increase in the amount of building projected this year as compared with the corresponding period a year ago.

80+93=173

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Up in Springfield, Vt., The Jones & Lamson Machine Co. gave 80 Burt Ventilators the searching test of four years' use. Then, with an increase in their floor space, they required more ventilators. There was no hesitation in placing the order. It came to Burt and it was for 93 ventilators. That seems a pretty good proof of how Jones & Lamson feel on the ventilating problem.

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A business man recently told us, "I bought our three Reo Motor Trucks primarily because I saw that they would save money over the old method of hauling. But I am delighted to find another advantage. They have keyed up our entire business—in every department—to a quicker step."

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Users of Reo Trucks say there has never been another motor truck built to equal it.

The American Sash & Door Co., Kansas City, Mo., recently wrote: "Our hauls are approximately 40 miles per day, full capacity loads, and our truck is averaging 5½ miles per gallon over a variety of road surfaces. We have spent absolutely nothing for repair parts, and the ease with which the truck takes its load has been a revelation, in the ability of a truck of its price to keep up its end with the higher-priced trucks in our fleet."

We are getting this kind of evidence from all parts of the country, and in all lines of business.

YOU CAN DO IT WITH A REO

The remarkably low price of the Reo makes business men more critical of its performance than they would otherwise be, yet a careful inspection of this splendid truck never fails to win the highest praise.

Here are some of the features that mark the Reo as the most advanced type of medium heavy-duty motor truck now on the market: Reo Sectional Radiator, of 24 separate interchangeable units, may be repaired on the road anywhere; motor, clutch and transmission are cushioned on a sub-frame, away from jars and road-shocks; left-side drive, and the best and handiest center control ever brought out; big armored front frame; demountable driver's cab; gas headlights and Prest-O-Lite tank, and many other details of design and construction that mark the utmost advance in modern engineering practice.

These features mean sure, unbroken service, low upkeep cost and that wide margin of safety that a motor truck must have to meet the frequent emergencies of extra service, bad roads and overloading, that cannot be otherwise forestalled.

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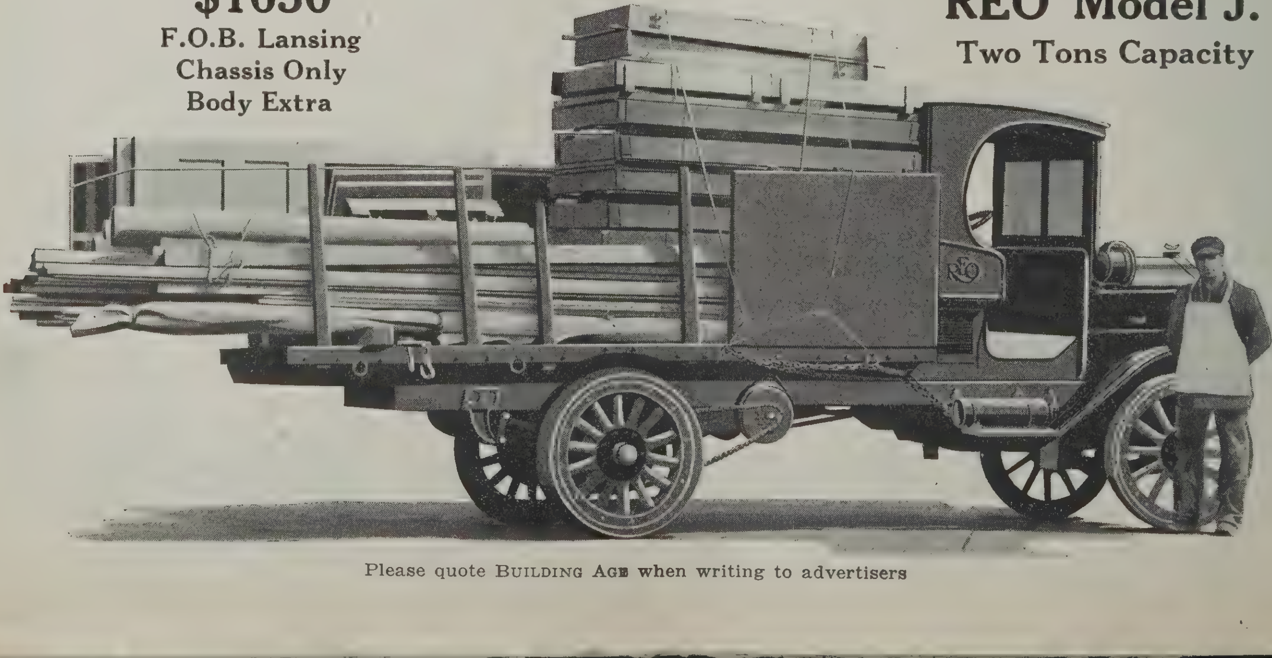


Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to
do with the Various Branches of the Building Business

The "Neponset" Wall Board

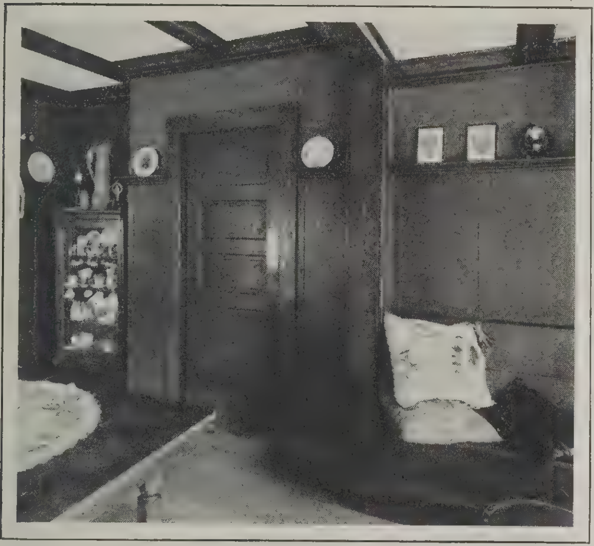


Fig. 1—A Dining Room Interior Treated with "Neponset" Wall Board

One of the many methods of finishing the rooms of our modern dwellings and other buildings and one which appears to be rapidly growing in popularity in all sections of the country involves the use of wall board of which numerous varieties are at present on the market. This growing popularity is due among other things to the wide application, the economy and the ease with which the board may be put in place and finished, as well as to the very satisfactory results obtained after it has been applied. Prominent among the wall boards in which our readers are likely to be interested is the "Neponset," made of tough fiber and which measures something over ⅛ of an inch in thickness. One of the special features of this board is that the surfaces have been thoroughly waterproofed to prevent the board from absorbing moisture and another is that the board requires no other decoration, as it is made in three finishes—plain oak, burnt leather and cream white. The latter finish is especially recommended by the manufacturer for work where it is desired to use paint as it is said to take paint better than the other finishes. Neponset wall board is sold in sheets measuring 7, 8, 9 and 10 ft. in length and is 32 in. wide, this being well adapted for standard studding placed 16 in. on centers. With a heavy knife or saw the wall board may be cut into any length or width desired. It is made by Bird & Son, 15 River Street, East Walpole, Mass., who point out that the joints between panels should be covered with wooden battens or with Neponset wall board battens, which are made in the same finishes and lengths as the wall board itself. In Fig. 1 of the illustrations we show a portion of the dining room in a dwelling house in Winthrop, Mass., the walls being covered with Neponset Wall Board of plain oak finish.

When used instead of lath and plaster as, for instance in a new building, the wall board is nailed directly to the studding and joists, but in old work where the plaster is already on the walls the board is applied the same way as on new work, only longer nails must be used in order to penetrate through the plaster and reach the studding and joists. Another use of Neponset wall board is for building partitions in the home or for commercial purposes. When used for partitions a frame work should first be built and then the wall board applied as in the case of any new work. There should always be a firm backing to which all four edges of the sheets are nailed. In a booklet sent out by the company various applications of the wall board are shown, many of the illustrations being in colors in order to give an idea of the handsome effects which may be produced.

Change of P. & F. Corbin's New York Offices

P. & F. Corbin have consolidated the uptown and downtown offices in New York City and installed them in commodious quarters in the new Architects' Building at No. 101 Park Avenue. The change was made primarily to secure a closer connection between the business of the two stores, and also to gain the advantages of a more central location and of more convenient quarters, neither of the two former offices being susceptible of expansion to contain the forces of both. The new offices are within two minutes' walk of the entrance to the Grand Central Station, where the subway, surface and elevated lines meet and could hardly be easier of access from all parts of the city. They are lifted above the street level into the light and air and away from the noise and dust caused by traffic. The rooms front on Park Avenue and Fortieth Street. The display rooms are a model of convenience and artistic arrangement and are flooded with light. The entire effect is a most happy one, combining utility and beauty in an original and highly satisfactory manner. Deliveries of goods are made from the warerooms at 98 Lafayette Street, but all business is conducted from the new offices in the Architects' Building.

Automatic Electric Floor Surfacing Machine

A floor surfacing machine embodying a number of interesting features which cannot fail to strongly appeal to the carpenter-contractor, the builder and floor layers generally is that illustrated in general view in Fig. 2 and which is being placed on the market by Wayvell Chappell & Co., 4844 Ravenswood Avenue, Chicago, Ill. This machine is made with heavy steel ball bearings on all running parts so that the cutting roller and the two 9 in. suction fans spin true and easy. The arrangement of parts is such that the roller may be either flexible for easy adjustment to the floor inequalities or it may be rigid so as to level the floor

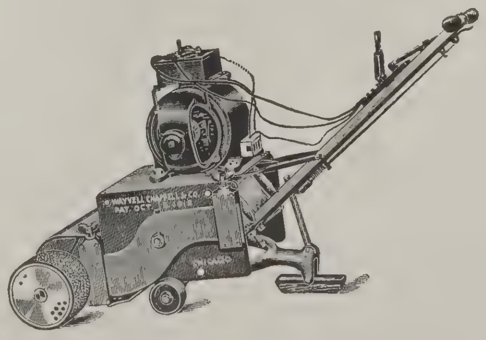


Fig. 2—Automatic Electric Floor Surfacing Machine

quickly. It is held by a pair of heavy centrally pivoted arms adjustable at both ends by thumb screws pressing against cushions. The mechanism is such as to brake the machine for easy work and to gauge the depth of the roller cut. This brake-gauge has a bottom of polished wood and is of a length to span two ordinary floor boards. It slides on the high edges, thus steadying the machine and gauges the depth of cut by firmly holding the handle in any position it has been tilted and locked by means of the small lever shown on the handle. It also brakes the forward pull of the machine which is self-propelling in operation, making continuous work easy, either when roughing with the roller flexible and using coarse sandpaper or in going over the boards for the last time with the roller rigid and using fine sandpaper. The machines are made in several sizes, thus adapting them for small rooms or large areas. Floors may be surfaced close up to the base boards by means of the edge roller, shown in the illustration and which is quickly adjustable to either side of the main roller as its shaft is slipped through the hollow surfacing roller shaft from either side.

The "Little Devil" Concrete Mixer

A concrete mixer of compact and durable construction and said to embody all the qualities of a large mixer is the "Little Devil," illustrated in general view in Fig. 3, which shows it as it appears mounted upon a truck and as made by the Chicago Builders' Specialties Company, Old Colony Building, Chicago, Ill. In the construction of the mixer steel channels cross-braced and securely riveted are used for the frame. The corners are reinforced with gusset plates, thus rendering it extremely rigid. The drum is of boiler plate and the few blades and buckets required are scientifically arranged so as to give a good mix and then discharge rapidly and clean. The drum rollers are of chilled semi-steel, fitted with roller bearings. Caps are fitted on both sides of the hub, thus making the bearings dust-proof. The segment gear is referred to as an important safe-guard against delays. All segments are duplicates and can be replaced in the field in case of accident with very little expense or loss of time. The mixer is driven by means of cut steel gears direct from the engine shaft, there being no chains necessary. The hoisting drum is on the main driving shaft and is controlled by a powerful friction clutch. It is intended to handle a batch of mixed concrete at a time, this being a great convenience and labor saver when filling "forms," especially in connection with silo work. The company makes use of a 3½-hp. "New-Way" air cooled engine with the gasoline in the base. The engine may be enclosed in a steel house, the top and front of which are hinged so as to give ready access to the engine. The hight of the charging platform from the ground is only 17 in. The company states that the "Little Devil" mixer can be furnished mounted on two or four wheels according to requirements. It has a capacity of 5 cu. ft. of loose material or 3½ cu. ft. of mixed concrete and is proving very popular with builders.

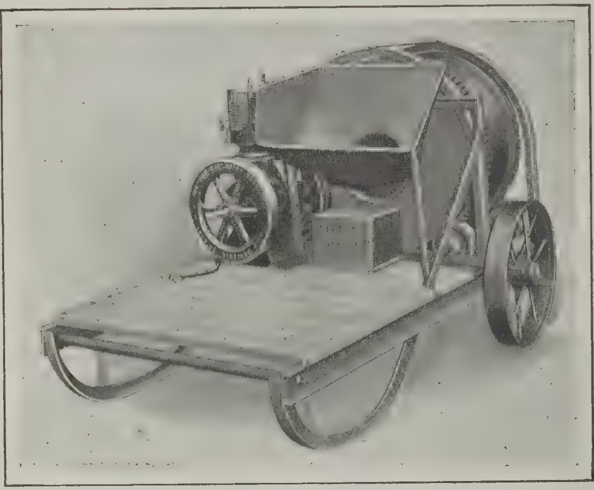


Fig. 3—General View of the "Little Devil" Concrete Mixer

Lane's Steel Hanger Rail for Barn Doors

A new style of barn door hanger rail has recently been placed on the market by the Lane Bros. Co., Poughkeepsie, N. Y., a view of which is shown in Fig. 4. This is a tubular rail, supplied with loose steel brackets, and is referred to as permitting of a departure from anything heretofore furnished by the company in that line. This new style of loose steel bracket for a round track may be inserted through the side of the rail anywhere and not necessarily from one end. This is a great convenience in erecting. The form of the bracket—double braced, and of steel—is such as to give great strength with an unusually narrow slot. The screw holes diagonally arranged are not in line with the grain of the wood to which they are attached. Sufficient quantity of brackets are furnished for spacing 16-in. centers. Separate long tubular dowels are included for joining the rail sections in perfect alignment, also end stops as required. This rail may be used with any type of tubular hanger. The particular feature of advantage in this type of loose bracket rail is that the brackets may be inserted anywhere along the length of the track and it is not necessary to drive them in from the end.

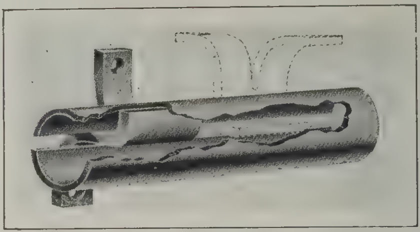


Fig. 4—Lane's Steel Hanger Rail for Barn Doors

Seamless Metallic Door Stops

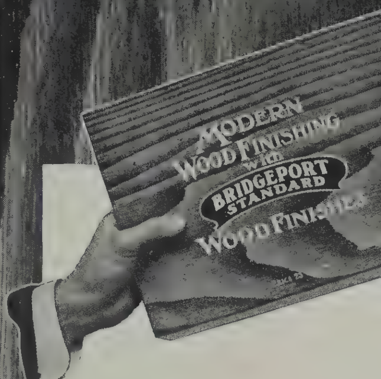
The Lumley-Denly Company, Cleveland, Ohio, is bringing out a line of patent seamless metallic door stops, which is claimed to be the only one on the market made of seamless metal and with screws that extend clear through the knob. The screw extends from the rubber tip through the knob and into the wood, bringing all strain on the screw endwise. The screws are 3½ in. long. The seamless bodies are drawn from one piece of metal. The bases are seamless and made so they cannot cut into the wood. The rubber tips are the best quality and are vulcanized to the head of the screw. The stops are furnished in any finish wanted on steel, bronze or brass. The company's sales office has recently been removed from 419 Frankfort Avenue, to 824 Columbia Building, Cleveland, Ohio. C. T. Denly is sales manager. The plant is at Ashtabula, Ohio.

The Greyhound Glass Cutter

The Millers Falls Company, Millers Falls, Mass., and with New York City office at 28 Warren Street, has just placed upon the market the Greyhound Glass Cutter, No. 300, illustrated in general view in Fig. 5. In this device there are six steel wheels set in a revolving turret and clamped in place by set screws. The frame is nickel-plated and the wooden handle is enameled. The wheels in this glass cutter are said to have been so perfected that their cutting qualities are entirely satisfactory in every respect. Each cutter weighs a trifle more than ½ an ounce and an entire dozen weighs only one-half a pound.

Fig. 5—The Greyhound Glass Cutter

(Continued on page 78)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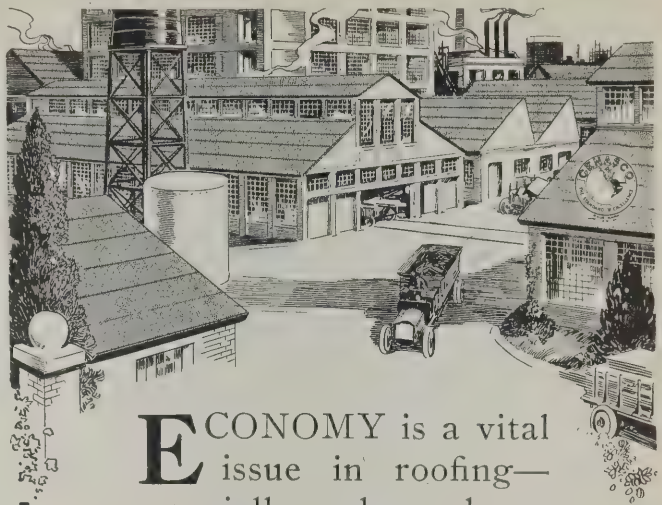

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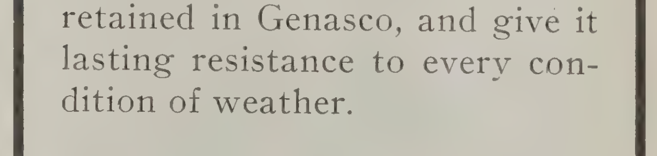
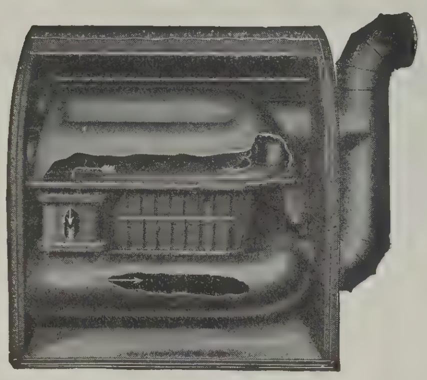


The Brien Heater



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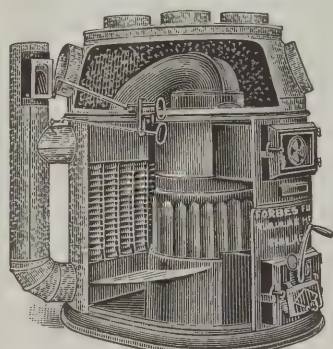

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Steel Folding Builders Bracket No. 261

The Richards-Wilcox Mfg. Company, Aurora, Ill., has recently incorporated some improvements in its steel folding builders bracket and we present in Fig. 6 a view of it as now made. The bracket embodies all the desirable features of the company's No. 231 bracket and in addition is fitted with a new sway brace which prevents the bracket from swaying when in use. The arrangement of parts is such that the bracket can be compactly folded for transportation from one job to another, the statement being made that a dozen brackets occupy a space of only 7 x 13 in. and the length of the bracket in the bottom of a wagon. A comparison of a dozen of the steel folding brackets with a dozen of the old style wooden brackets readily show this advantage. The Steel Bracket No. 261 is strong, convenient and durable, the point being made that it will save its cost on one or two jobs on which it may be used. The practical carpenter and builder will readily understand the operation of the bracket from an inspection of the picture of it which we give herewith.

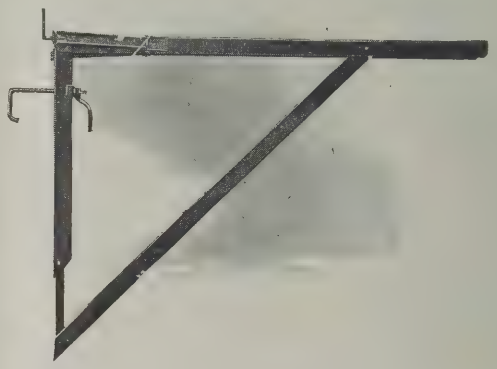


Fig. 6—Steel Folding Builders Bracket No. 261

Ideal Type "C" Mixer

With a view to meeting the requirements of the trade the Ideal Concrete Machinery Company, 1310 Monmouth Avenue, Cincinnati, Ohio, has recently made some improvements in the concrete mixer which it has been offering for some little time past. This improved batch mixer is known as Type "C" and has a capacity of 5 cu. ft. of mixed concrete per batch as compared with 4 cu. ft.—the capacity of the old type. This improved mixer is intended for the use of both small and large contractors who require a mixer which can be taken in tight places and rapidly deliver a large quantity of thoroughly mixed concrete. The frame is 68 in. long by 42 in. wide, this being the maximum floor or ground space required. As will be seen from an in-inspection of Fig. 7, the trucks are so arranged that the wheels are entirely beneath the mixer. This, it is pointed out, is a very desirable feature because they are entirely out of the way when loading or discharging material. The charging chute which is arranged to take the gravel directly from a wheelbarrow is only 40 in. from the ground. This enables the aggregate to be dumped in direct from the wheelbarrow, using a low platform. The end of the discharging chute is 24 in. above the ground, which gives ample space for the wheelbarrow to be run beneath it to receive the mixed material. The mixer blades are inclined from each end to the middle of the drum giving the concrete an end to end motion which is said to be the most

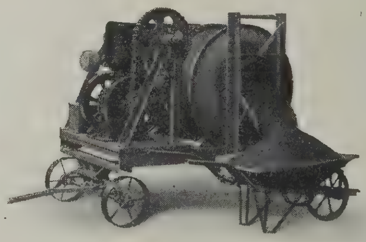
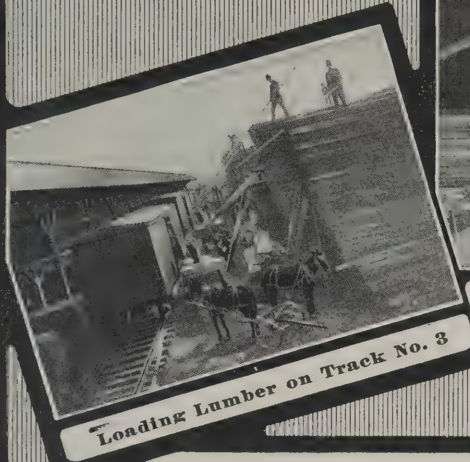


Fig. 7—The Ideal Type "C" Mixer

(Continued on page 80)



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Doors

2-8x6-8 1⅜ One Panel Fir	$2.64
2-8x6-8 1⅜ Five Cross Panel Yellow Pine	2.09

Rough Lumber BARGAINS

	Price per 1000 ft.
2x 4, 16 Ft. No. 1 Yellow Pine,	$19.75
2x 6, 16 Ft. No. 1 Yellow Pine,	18.75
2x 8, 16 Ft. No. 1 Yellow Pine,	19.25
2x10, 16 Ft. No. 1 Yellow Pine,	20.00
2x12, 16 Ft. No. 1 Yellow Pine,	21.00
2x 4, 16 Ft. No. 2 Yellow Pine,	17.75
2x 6, 16 Ft. No. 2 Yellow Pine,	16.75
2x 8, 16 Ft. No. 2 Yellow Pine,	17.25
6x 6, 16 Ft. No. 1 Yellow Pine,	23.50
8x 8, 16 Ft. No. 1 Yellow Pine,	23.50

We Guarantee Safe Delivery to Your Station

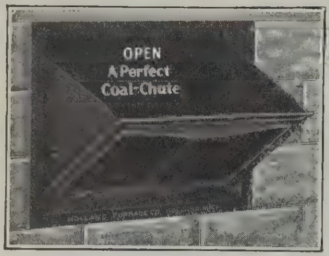
Write for Our Grand 5,000 Bargain Catalog NOW!

Get an idea of Gordon-VanTine *Prices*. Get an idea of the scope of a 5,000 Bargain Stock. See how many things can be shipped *Anywhere at once*. See how little freight costs. Then remember Gordon-VanTine guarantee prompt shipment, safe delivery and satisfaction, no matter where you live. Write for this catalog—this price guide. Then try a test order. See why there were 1,000 testimonials and 18,000 orders from contractors and carpenters last year.

GORDON-VANTINE CO.

707 FEDERAL ST. DAVENPORT, IOWA

The WINDOW CHUTE



For
Your
Coal
Bin

Ready for the Coal Man.

The Window Chute
is a selling feature for any Residence or Building.

Thousands in Use—
The Very Best

If You Build
Buy
Own

Be up to date
and have the
world's best.

*Write for
Booklet C*

A Light Basement.

HOLLAND FURNACE CO.
Holland, Mich.

World's Largest Direct Installers of Furnaces

"Illinois"
Self-Watering Flower Boxes
Pat. Jan. 29, 1907; June 22, 1900.

Make Success with Plants a Certainty.
Descriptive Circulars Sent on Request.

MILLER & DOING
39-43 York St. 83-87 Washington St.
BROOKLYN, N. Y.

*Manufacturers of Architectural Sheet Metal Ornaments and Statuary of Bronze, Copper, Brass or Zinc.
Catalogue on Request.*

rapid and thorough method of mixing. The dumping cups are nearly in the middle of the drum and dump into the discharge chute, which extends half way through the drum when in the discharging position. This is said to cause the mixer to discharge with great rapidity and clean itself thoroughly. The drive is through the medium of an extra heavy malleable chain.

The Maydole Hammers

Every mechanic in the country having occasion to use a hammer is likely to be interested in the very attractive 64-page catalogue of Maydole hammers which has just been issued from the press by the David Maydole Hammer Company, Norwich, N. Y. Each tool is forged from the best refined crucible-cast steel made expressly for the company's use. Each end of the hammer head is separately and differently tempered and with direct reference to the work it has to perform. The handles are made by the company from thoroughly air-seasoned second growth hickory. Every hammer bearing the company's trade mark is warranted to be first-class in every respect and the company states that any Maydole hammer which proves to be defective in proper use will, if returned to it, be replaced. In the catalogue before us an increased variety of hammers as compared with previous editions are shown and in connection with the illustrations are given numbers, sizes, weights and code words, the descriptive text appearing in French, German, English and Spanish. The hammers illustrated are adapted to about every conceivable purpose for which a hammer would be used and the matter is arranged in a way which cannot fail to strongly appeal to the practical mechanic, more especially if he be engaged in any branch of the building industry. A comprehensive index alphabetically arranged is not the least interesting feature of this very attractive specimen of trade literature.

Disston's Handbook on Saws

We have just received from Henry Disston & Sons, proprietors of the Keystone Saw, Tool, Steel and File Works, Philadelphia, Pa., a copy of the handbook issued by this well-known concern and consisting for the most part of a treatise on the construction of saws and how to keep them in order. There is also a great deal of other interesting information of a kindred character and which is likely to be appreciated by every mechanic having occasion to use a saw. The early pages are given up to a brief history of saws and the business started by Henry Disston, who established himself in 1840, although he learned his trade with William and Charles Johnson, who commenced the manufacture of saws in Philadelphia in 1836. From a small beginning the business expanded until at the present time employment is given to several thousand hands.

In addition to telling how saws are made and how to keep them in order the reader is told what constitutes hand and rip saws, and illustrated descriptions are given of saw sets, clamps, jointers, saws for cutting metal, wood saws, circular saws and the making of Disston plumb and levels, tri-squares and bevels, screw drivers, trowels, files, rasps, etc.

"Stucco" on Truss-Loop Metal Lath

Under the above suggestive title the Bostwick Steel Lath Company, Niles, Ohio, has issued a very attractive pamphlet carrying a number of halftone engravings of buildings showing by means of a few examples the beauty of "stucco" exteriors when plastered upon Truss-Loop Metal Lath. These buildings cover a wide range running all the way from the private residence to the elaborate apartment house and embracing in addition schoolhouses, churches, farm barns, etc. The Truss-Loop lath to which special attention is directed is made of non-corrosive 24-gauge metal and weighs 8 lb. to the sq. yd. None of the metal is cut away, but loops of just the proper size are expanded into the shape of miniature trusses—the strongest form of support—and these are distributed at exactly the correct distance; all to the end that not only shall the greatest strength

(Continued on page 82)

SPEEDING UP THE JOB

SOONER or later, every contractor asks himself the question: "How can I speed up my job?" For some reason or other you have to rush the work. Will your concrete mixing plant stand the extra strain, or will it fall down on the job? You realize as no one else can how much money you lose every time your mixer is shut down for repairs during the ordinary work. How much greater will be your loss, therefore, when it comes to the "hurry up" work? What you want is a mixer that is compact and has few wearing parts—one that operates easily—one that is built right, of good material and excellent workmanship—a mixer that will be "ON THE JOB" every moment. Such a mixer is the all-steel

No. 5 Smith-Chicago Special

Send for No. 5 Smith-Chicago Mixer Folder No. 40-T Including Special Proposal

It's a batch mixer of an approved type, with a 3½ cubic foot wet capacity. Back of it is the guarantee of the biggest concrete mixer manufacturer in the U. S. It is not a new machine. Ten years have been spent in perfecting it—in bringing it to a point where the contracting trade recognize it as a mixer they can bank on at all stages of the game.

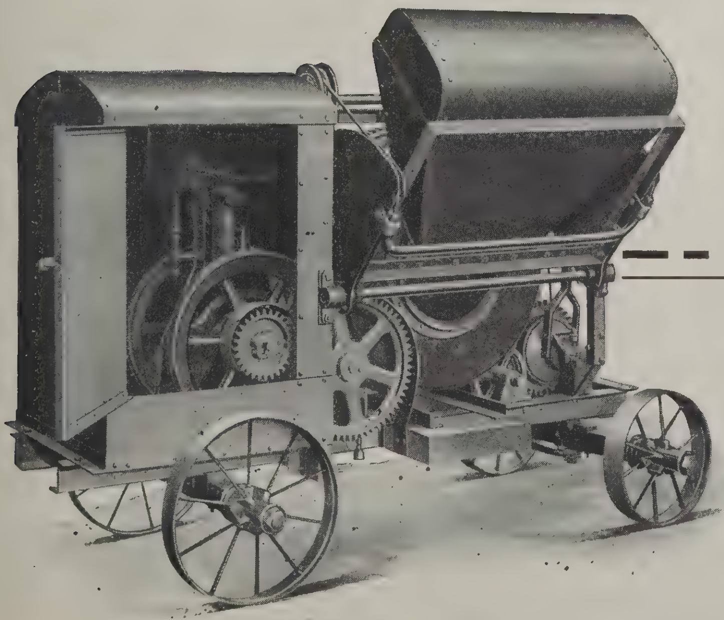
Can you add to its modern, up-to-date features? Check over its advantages: All-steel construction; heavy Z-bar frame; "ground level" loading skip; central drive ring and roller tracks; easily operated "external" discharge spout; large patented scoop blades which give a perfect mix and fast discharge. Before risking your money on other equipment, post yourself about this machine which has demonstrated its fitness on all classes of work. Send for No. 5 Smith-Chicago Folder No. 40-T.

The T. L. SMITH Co.
3120 Hadley St., Milwaukee Wis.

1311 Old Colony Building
Chicago

Bunting-Stone Hdwe. Co.,
805 Walnut St.,
Kansas City, Mo.

Patton-Bowman Hdwe. Co.,
1205 Howard St.,
Omaha, Neb.



MAILING COUPON

I am interested in a Concrete Mixer that will mix from 40 to 50 yards daily. Without any obligation on my part, send me No. 5 SMITH-CHICAGO Folder No. 40-T and SPECIAL PROPOSAL.

Name ....

Address ....

MAJESTIC COAL-CHUTES

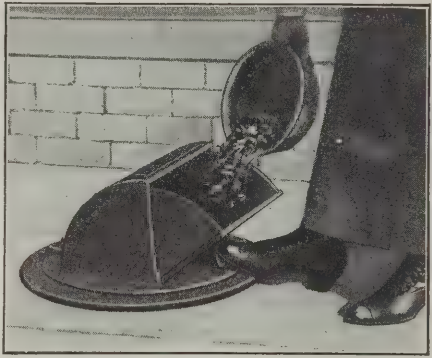
Protect the Building

Acts as a window when not in use.

Made in two styles and two sizes.

Send for complete catalogue showing our Burglar Proof all metal Cellar Window.

THE MAJESTIC GARBAGE RECEIVER



Buries under the ground keeping the contents cool in summer and from freezing in winter.

Also contains a device for burning waste paper and refuse.

Write for full description.

THE MAJESTIC CO., 422 Erie St., Huntington, Ind.
Branch Office and Warehouse:
311 Reliance Bldg., Kansas City, Mo.

PREPARED

Is the contractor who has his "Big-an-Litle" Mixer ready for the first job in the Spring.

and that is where the

"Big-an-Litle" Fills the Bill

BECAUSE

It is built of the best iron and steel—by the best mechanics.
It mixes all kinds of concrete, mortar, etc.
It requires very little operating expense, and attention.
It costs next to nothing for upkeep.
It is always ready to do business every day.
It is priced to you on a cash basis and sold at a low figure.
It can be furnished with or without power, or with a Hoist, or Loader, and the engine can be used for other purposes.
A mixer and outfit built for YOUR particular purpose.

Get our catalog and information and your "Big-an-Litle" will come later. Increased profits—More contracts—Better quality work, all go Hand in Hand with the "Big-an-Litle."

The Yaeger Machine Co.
216 W. Rich St., Columbus, Ohio

and rigidity in every direction be attained but a perfect key secured on both faces with the use of a minimum amount of plaster and labor. By reason of this advantage it is possible to space the lath from 16 to 20 in. on centers and use no furring. This of course is a decided saving in cost.

Drafting Outfits

Those of our readers who have occasion to make drawings in connection with their business cannot fail to be interested in a catalogue of drafting outfits and supplies which has been issued by the T-Square & Triangle Company, Baldwin Building, 32 Clinton Street, Newark, N. J. This concern makes a specialty of complete outfits with or without drawing tables for the carpenter, the builder, the architect and the draftsman, and in the catalogue in question the goods are enumerated and special prices are given. The statement is made that should a purchaser fail to be satisfied with the goods selected the company will permit of their return and will refund the money within ten days. The outfit is of such a nature that it can be used for designing any job of work the builder may be called upon to execute and at the same time it will be found useful to have around buildings while they are in course of construction. An outfit consists of a board, a T-square, triangles, a set of instruments, a scale, thumb tacks, pencils, rubber, curve, etc. A copy of the catalogue in question will be sent to any reader of *The Building Age* on application to the address given.

"Century" Asbestos Shingles

We have just received from the Asbestos Shingle, Slate & Sheathing Company, Ambler, Pa., a handsomely illustrated *brochure* carrying numerous half tone engravings showing buildings of all sorts designed by both American and foreign architects and on which Century asbestos shingles have been used. The statement is made that the company has been favored with a number of specifications by the United States Government, which it is well known selects a material for specification only after exhaustive test. Many of the roofs illustrated show the French or diagonal method, also the honeycomb effect, a good idea of which may be obtained from an inspection of Fig. 8 of the engravings. In laying these roofs the rafters are covered with well-seasoned tongued and grooved boards, not more than 9 in. wide, and over these is placed one-ply slater's felt, tacked on with 4-in. lap. On this in turn are laid the shingles. Among the closing pages are details showing how the shingles are laid in order to give the different effects.

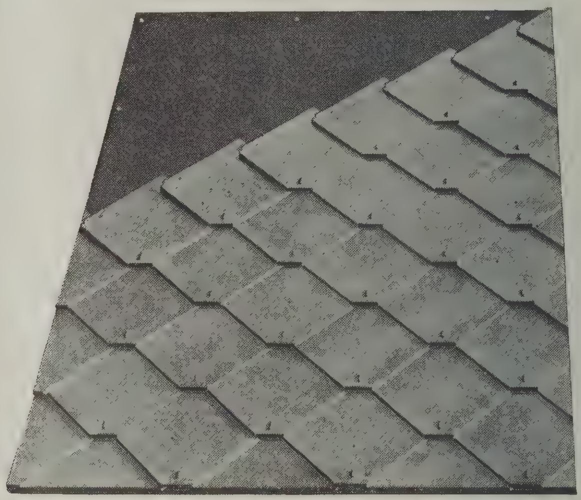
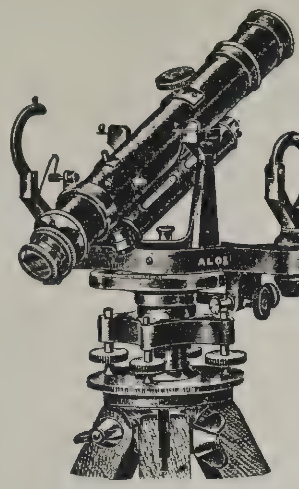


Fig. 8—"Century" Asbestos Shingles

House Painted 11 Years Ago Still in Good Condition

Out in Lynville, Iowa, is a house which was painted in June twelve years ago, with Lowe Brothers High Standard Liquid Paint. The north, west and east sides are still in very good condition. The paint is intact

(Continued on page 84)



Rent this Level 10 Months Then It's Yours

Builders — Contractors — Architects

This is not the old style Architect's Level. It is the newest model *convertible* level. There is not a single Builder, Contractor or Architect who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder, contractor or architect can use the Convertible Level, sent free on request.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

A. S. Aloe Co., 625 Olive St., St. Louis, Mo.

WARNING

The Level we offer is the new Aloe Convertible Level. Don't confuse the Convertible Level with the ordinary style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified transit and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

COUPON

A. S. Aloe Co.,
625 Olive St., St. Louis, Mo.

Please send free instruction book on the use of the Convertible Level and complete details of your rental plan. This request in no way obligates me.

Name ....
Occupation ....
Street ....
City.................... State............
B. A., June, '14.

Mixing too Slow? Put a "Little Devil" on the Job

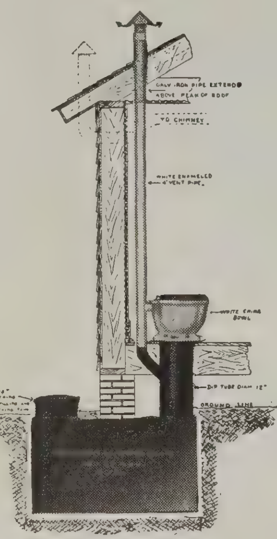
Any job that is worth going after is worth doing promptly and well. You don't want to risk your reputation on concrete that is poorly mixed. You don't want to waste your men's time waiting around for results from a slow, ineffective mixer.

Put a "Little Devil" on the hurry-up job and see it get action. The "Little Devil" is a strong, rapid, efficient, and easily portable mixer, designed for work such as foundations, sidewalls, curbs and gutters, silos, conduits, etc., where a large volume is not required.

Don't buy a mixer until you have investigated the "Little Devil." Write today for full information.

Chicago Builders' Specialties Co.
Old Colony Building
Chicago, Ill.

Installing a Kaustine Sanitary Closet Means a Satisfied Household


GALV. IRON PIPE EXTENDS ABOVE PEAK OF ROOF
TO CHIMNEY
WHITE ENAMELED 4" VENT PIPE
WHITE CHINA BOWL
DIP TUBE DIAM 12"
GROUND LINE
14" OPENING FOR FILLING AND EMPTYING TANK

If you are building where there is neither sewer nor water, by all means install a *Kaustine Sanitary Closet.* It can be placed inside or outside. It requires no plumbing. It means comfort and health.

If you are remodeling a home or other building, you will find that a Kaustine Sanitary Closet can be installed at small expense and it will be the master comfort feature.

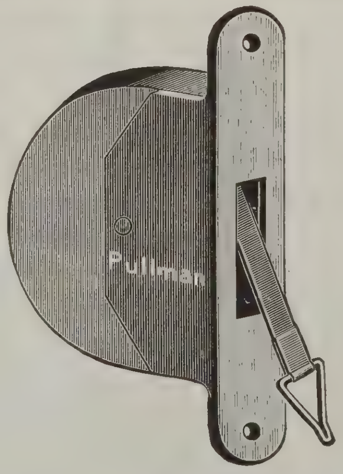
This wonderful perfected invention has done away with the bugaboo of sanitation where there is neither sewer nor water.

We have a special introductory proposition for every contractor and carpenter and builder. We find that the introduction of one of these outfits means the sale of many, consequently we are making special effort to place an outfit in each locality. Write for our Building Age Proposition.

KAUSTINE COMPANY
Dept. G
Buffalo, N. Y.

Mr. Builder:
You will please your customers better, and save money for yourself if you

Pullmanize Your Windows



Pullman Unit Sash Balances

are easier to install and cost less than cords and weights, and they work better, look better and last longer.
Architects everywhere are specifying them.

Unit Sash Balances

are made of pressed steel throughout, have uniform faceplates so all mortises may be cut when frames are made, and we guarantee them for 10 years.
Whether you will build, remodel or repair get full information. Ask for handsome book "Modern Windows."

PULLMAN MFG. COMPANY
8 Industrial Street Rochester, N. Y.

and shows no sign of cracking or peeling. The south side of the building is worn, leaving however a good surface for repainting. The condition of the paint on this building is remarkable, especially when it is compared with the house adjoining, which was painted six years ago with another brand of liquid paint. These two houses certainly are proving to the people of Lyndville how well "High Standard" wears when contrasted with other brands and under the same climatic conditions. In regard to this house a letter was received by Lowe Brothers Company referring to some pictures taken of a residence in Lynville, Iowa, showing how its paint was wearing. One picture was a "close up" view of the boards, and made such a good showing at the time that the writer of the letter made cuts from it for the "Little Blue Flag." "A few days ago," said the writer, "I visited Lynville, and while there, took pains to look up this house and found that it had not been repainted. This makes the eleventh summer since the last painting, and I found there was not a bare board, a peel or a crack. It made such a good showing of High Standard Paint and wear that I could not refrain from writing about it although I am out of the paint business at the present time."

Shelby Push Bars and Screen Door Guards

The Shelby Spring Hinge Company, Shelby, Ohio, has just added to its already extensive line of hardware specialties the Shelby Push Bars and Screen Door Guards, an illustration of which is shown in Fig. 9 of the engravings. The upper view represents the push bar and the lower view the screen door guard. Both are made in 30 and 36-in. lengths and are ½ in. in diameter with detachable ends. If for any reason shorter lengths are desired it is only necessary to cut the rod with a hack saw to the proper length. The goods are sent out in the regular hardware finishes so as to meet varying requirements.

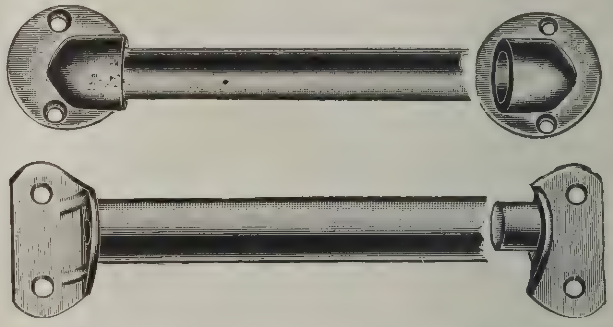
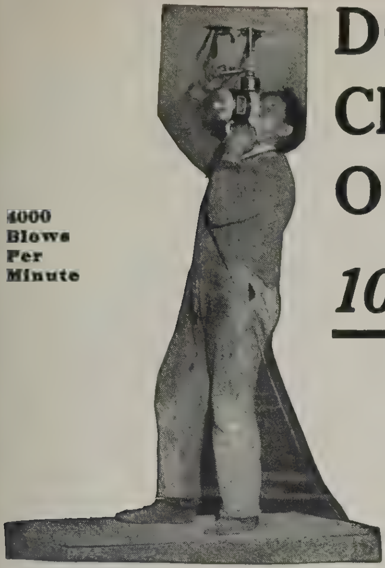


Fig. 9—The Shelby Push Bars and Screen Door Guards

Uniform Mixing of Concrete an Important Asset

One of the latest examples of the advantages of uniformity in the mixing of concrete is shown in the work done in connection with the quarter million gallon reinforced concrete water tank at Fort Strong in Boston Harbor. The tank was built for the use of the artillery post and was constructed under the supervision of the Quartermaster Department of the Army. The tank is circular in shape, having an inside diameter of 50 ft. and a depth of 16 ft. The walls are only 8 in. thick and notwithstanding this comparatively thin section no difficulty is experienced in securing a water tight construction with an addition of only 5 per cent. hydrated lime to the weight of the cement in a 1 to 4½ mixture. In view of the fact that it was necessary that the concrete should be of the highest and most uniform mix in order to give the walls sufficient strength to withstand the low temperature to which they were subjected shortly after being poured, the contractors made use of a Standard low charging mixer made by the Standard Scale & Supply Company, 243-45 Water Street, Pittsburgh, Pa. This machine is of such construction that it could be set in a narrow space close to the side of the embankment and discharge the batch

(*Continued on page 86*)

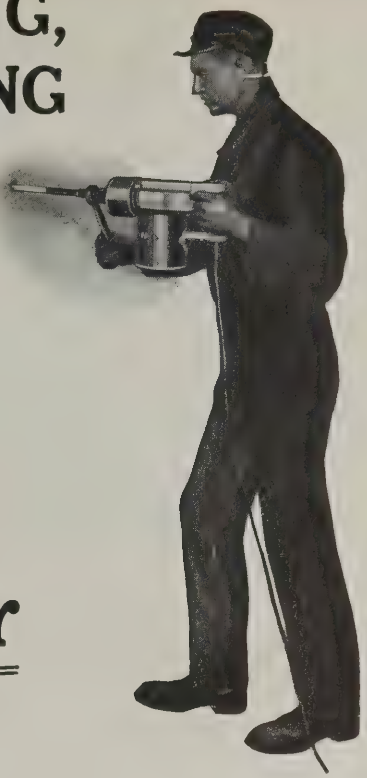


4000 Blows Per Minute

DO YOUR DRILLING, CHIPPING, CAULKING OR SURFACING

10 Times As Fast

By Using
Either
An



Electric Hammer

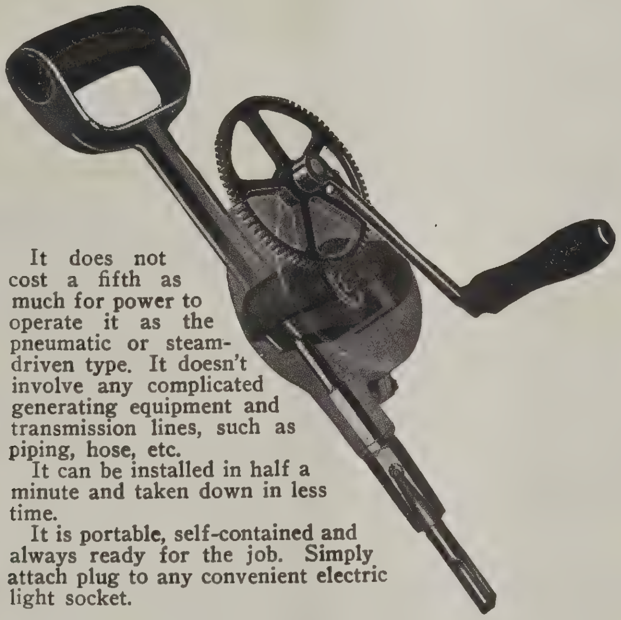
Or the Manually Operated

Drilhammer

If you have a lot of work to do, the solution of the problem for you is our ELECTRIC HAMMER.

If you have but a small amount of work to do at any one time, the DRILHAMMER is the thing to use.

Our ELECTRIC HAMMER is ten times as rapid as the crude, old-fashioned hit-and-miss method of striking the head of a drill or chisel with an ordinary hammer.



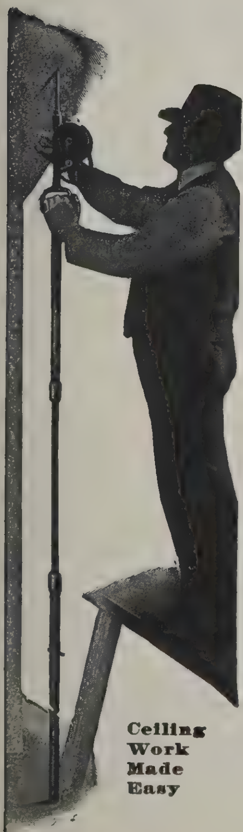
It does not cost a fifth as much for power to operate it as the pneumatic or steam-driven type. It doesn't involve any complicated generating equipment and transmission lines, such as piping, hose, etc.

It can be installed in half a minute and taken down in less time.

It is portable, self-contained and always ready for the job. Simply attach plug to any convenient electric light socket.

This ELECTRIC HAMMER is practically automatic — same pressure which holds tool against work closes switch in handle and starts operation. Delivers four thousand blows a minute. Built for various voltages. Requires only one to two amperes on 110-volt circuit. Bulletin "A. H." describes it.

For use on direct current or can be used on alternating current by using a motor generator set.



Ceiling Work Made Easy

The Drilhammer

Does the work in one minute that takes ten times as long by cruder methods. Strikes 1,000 powerful hammer blows per minute. Operator simply turns the crank. Centrifugal force does the work. Hardened tool steel hammer elements revolving at high speed strike the blows.

Exceedingly simple in construction. Has no springs to weaken or wear out. Will tremendously cut down the cost of drilling concrete, brick, stone tile, conduit, walls, floors, ceilings, etc.

Made in two sizes and accommodates drills from ¼ to 1¼". Can be carried in regular tool kit. Sold at a price which will enable every electrical worker and mechanic to have one in his kit. Write for Bulletin "Y" and prices.

No Exertion

ORR & LOCKETT HARDWARE Co.
Established 1872
Main Office, 14-16 W. Randolph St., Chicago
Branch Offices { 401 Broome St., New York
Room 608-79 Milk St., Boston

Stanley Tools

No 386

Stanley Jointer Gauge
For Iron Planes

The Stanley Jointer Gauge is designed for use in connection with all sizes of Iron Jack or Jointer Planes.
It is a tool that will enable the workman to plane bevels of any angle between 30 and 90 degrees, or to square up the edges of boards with extreme accuracy.
All parts except the knob are of metal, and the joints and bearing surfaces are machined.
The method of attaching same to a Plane is such as to insure its being absolutely rigid when in use.
A hole is bored in each end of the gauge so that a wood face of any desired size may be attached, thus providing a bearing surface, longer or wider than the face of the gauge itself.
The tool is so constructed that it may be attached to either side of the Plane, making it equally adaptable for right or left hand work.
The wooden knob forms a convenient grip for the hand of the workman and can be placed at either end of the gauge.
All metal parts are nickel plated.

MANUFACTURED BY

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

The Man Who Can Tell a Good Saw

He looks down the "gutter" to note the set and the sharpening. Then he grasps the handle to see how the saw "hangs"—and if the handle fits the hand as it should. He notes the symmetry of the lines and the quality of the wood.

He makes sure that it bends regularly and evenly from point to butt in proportion as the width and gauge of the saw varies. He notes that the blade is not too heavy in comparison with the teeth, for that means less labor in using. His experience has proven to him that the thinner you can get a stiff saw the better for it makes less kerf and takes less exertion to drive it.

This is how the man who knows can test the merit of a saw. But he seldom uses his knowledge, for he has learned by his own experience, as well as the experience of others, that the best way to judge a good saw is to look for the Disston Brand.

HENRY DISSTON & SONS, Inc.
Established 1840
Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, U. S. A.

into buckets hung on a stiff-leg derrick. The derrick being set in the center was given full swing and the entire forms were poured without the necessity of moving the mixer. The point is made that the low heat conductivity of concrete was apparent during the unusually cold weather in last January, soon after the tank was filled, when the temperature was for several days about 15 degrees below zero as no trouble was experienced with the action of the float valve. Doubt is said to have been expressed whether the temperature inside the tank ever reached the freezing point.

Hydrolith Sanitary Flooring

In these days when the tendency is so strongly developed in the direction of sanitary and fireproof construction interest naturally attaches to these things calculated to bring about these conditions in connection with building construction. One of the many important features is the floor and in order to meet the demand for a flooring material which would be both hygienic and fireproof the Hydrolith Company, 23 to 27 Dean Street, Brooklyn, N. Y., brought out a composition flooring which has stood the test of time. It is of such a nature that it can be laid in a plastic state on either concrete or wood and can be had in any color. It may be laid in blocks giving a tile effect or plastic in a solid color, or the design may be made up of a number of colors. Although chiefly used as a flooring with sanitary base it is equally applicable for use on walls as a wainscoting by continuing the base upward for a distance of from 4 to 6 ft., according to requirements. It is well adapted for use in kitchens, bath rooms, hospitals, factories, theatres, residences, hotels and in fact all places where safety and resistance to wear are required. Hydrolith is said to be waterproof, fireproof and vermin-proof; is resilient and easy to the tread, although it has the finish of stone.

Speidel's Dumbwaiters and Hoisting Machinery

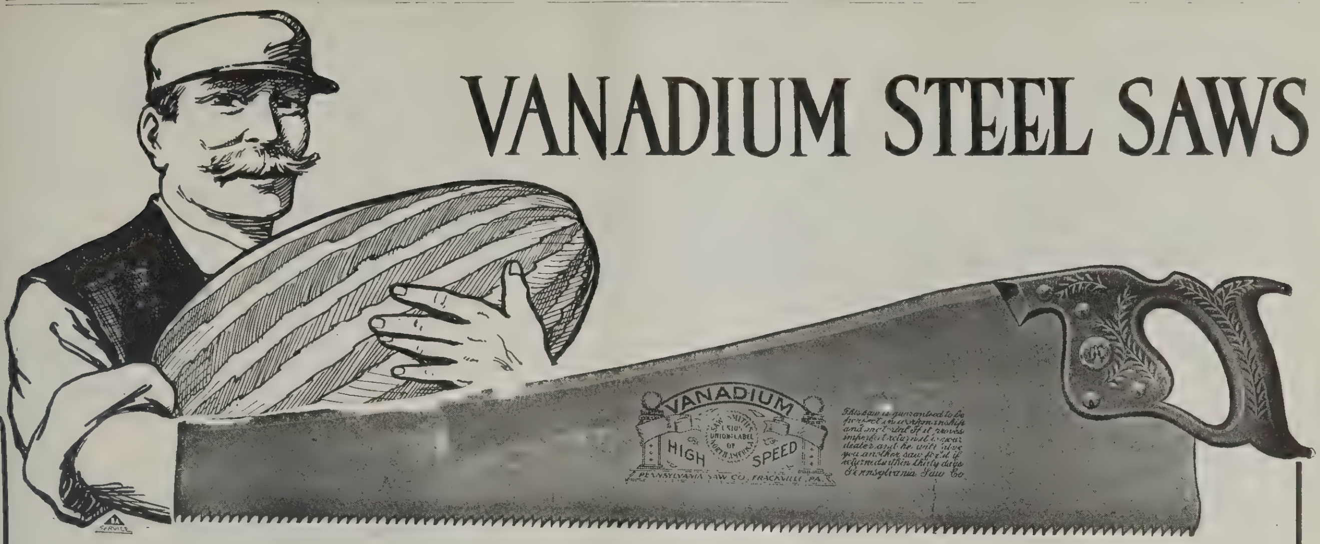
A copy of "Catalogue B," just issued from the press and relating to chain hoists, dumbwaiters, hand, belt power and electric elevators, cellar hoists, cranes, trollays, etc., reaches us from J. G. Speidel, Reading, Pa. The matter is arranged with much care and is illustrated in a way to command the attention of architects, builders, and house-owners generally. The manufacturer points out that improvements are constantly being made in his lines, thus keeping everything thoroughly up-to-date as regards quality of material, workmanship and efficiency. In connection with the various styles of elevators and hoisting machinery there are given descriptive particulars, sizes, dimensions, capacities, prices, etc., and these are supplemented in many cases by diagrams for determining the size of car required for any dimension of hatchway or where the size of car required is known the size of the hatchway can be determined. In the way of dumbwaiters illustrated descriptions are given of the "Jumper" which is of the disappearing type and which some might designate as a kitchen closet or refrigerator which sinks down into the cellar, the top being flush with the floor; also of the "Columbia" which is one of the maker's specialties.

Business of Heppes Company Unhampered by Recent Fire

According to an official statement recently received the fire which broke out in the plant of the Heppes Co., Kilbourne Avenue and Fillmore Street, Chicago, Ill., on the night of April 26, caused little, if any serious mishap to the business. Secretary O. A. Heppes said that while the total loss approximates $25,000 the damage was insufficient to affect the operation of business to any appreciable extent. "Deliveries on Utility Wall Board will probably be delayed for about ten days from the date of the fire," said Mr. Heppes. "We were unfortunate in losing a good part of our available reserve stock of wall board; but inasmuch as our manufacturing facilities are in no way impaired, we can safely promise deliveries within the ten-day limit I have given." There will be no interruption whatever in roofing deliveries as that section of the Heppes Com-

(*Continued on page 88*)

VANADIUM STEEL SAWS


VANADIUM
HIGH SPEED
PENNSYLVANIA SAW CO. FRACKVILLE, PA.

We Are Going to Cut a Melon

AND OFFER—TO EVERY CARPENTER AND MECHANIC AN OPPORTUNITY TO BECOME INTERESTED with us. We are going to present to the working Carpenter and Mechanic, absolutely **FREE, $25,000.00** worth of the capital stock of the Pennsylvania Saw Company, and why we are doing this, we will tell in a brief statement of fact:

> The Pennsylvania Saw Company has ample Capital and Knowledge to manufacture the **VANADIUM HIGH SPEED STEEL SAW,** the saw that has no equal, but believe by taking the Carpenter and Mechanic into Partnership—having them become Stockholders of the Pennsylvania Saw Company—that they will assist us to maintain the high standard of the **VANADIUM STEEL SAW.** We have now the most practicable Saw made, but we are always open for suggestions from the man who uses saws, and we **ALSO BELIEVE IN SHARING OUR PROFITS WITH THE MEN WHO HELP US.** You can therefore earn one, or as many shares of Stock in this Company as you might care to work for.

FOR EVERY $4.00 ORDER SENT DIRECT TO THE FACTORY, WE WILL PRESENT ONE SHARE OF CAPITAL STOCK—PAR VALUE $1.00 PER SHARE, and furthermore, this Company **GUARANTEES** to retire this Stock at the expiration of two years at $1.25 per share—cash—if the holder wishes to sell.

Here are the Prices for Vanadium Steel Saws

16″	18″	20″	22″	24″	26″	28″	30″	
$1.40	$1.50	$1.60	$1.75	$1.90	$2.00	$2.25	$2.50	any style and teeth.

Factory pays parcels post charges at these prices to any place in U. S.

Vanadium Steel Saws are guaranteed to be superior to all others.

A defective saw is immediately replaced.

IMPORTANT SUGGESTION:

If you cannot use enough Saws to make the $4.00, get one of your friends to order a Saw as a favor to you. You can then become a Stockholder in

Pennsylvania Saw Co., Frackville, Pa.

Gentlemen:

I enclose $........ for your BUILDING AGE June offer, for which send me by parcels post, prepaid

Length ....″, Teeth......... Wide Blade Straight Back Rip / Narrow " Skew " Cut off

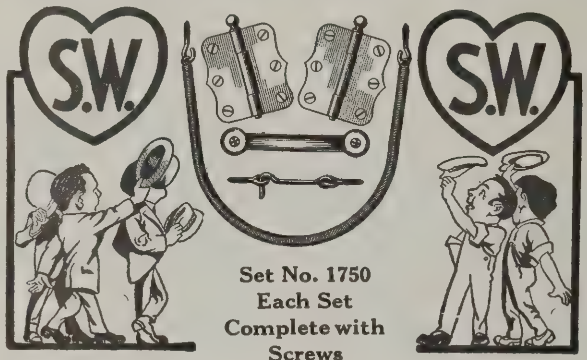
It is distinctly understood that I can return any or all of these Saws if they are not satisfactory after 30 days' trial, and that you will refund the purchase price upon receipt of Saws, in which case I agree to return Stock issued to me.

Name ....

Address ....

PENNSYLVANIA SAW CO., FRACKVILLE, PA.

STANLEY'S
Wrought Steel Screen Door Hardware



Set No. 1750
Each Set
Complete with
Screws

Ready to Go On the Screen Door

Owners and Builders alike are pleased with the high quality of the hardware and the convenient way it is packed ready for use.

Don't Swat the Fly—Keep Him Out

A screen door hung on a pair of Stanley Butts and held shut by a Stanley Spring will do better work than a dozen fly swatters. **The door is quickly and easily removed in fall by merely slipping out the pins, and it is as readily rehung in the spring.** Write for circular "E." It tells the story.

THE STANLEY WORKS
New York New Britain, Conn. Chicago

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895

TRADE MARK.

TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

pany plant was untouched by the flames. In fact, the day after the fire one of their biggest orders for "Flex-A-Tile" Giant Shingles—the new asphalt shingle of extra weight, strength and thickness—was placed upon the cars for shipment.

Majestic Garbage Receiver and Refuse Burner

An improved form of garbage receptacle which cannot fail to be appreciated by every householder in these times when the tendency is so strongly in the direction of sanitation about the house is the Majestic, which we illustrate in sectional view in Fig. 10 of the engravings. The body of the outer can of the garbage receiver is made of 16 gauge American ingot iron and the claim is made that it will not rust in the ground. It has a diameter of 19 in. and a hight of 30 in. The cast iron top consists of an outer rim which is bolted to the iron shell or outer drum and a hood shaped top which holds the removable hopper. The latter always remains closed when not in use, thus preventing any danger of the contents being reached by dogs, cats, rats or mice, as well as of the escape of odors. The hopper can be opened easily by the foot and just a little kick will easily and quickly shut it. The inner garbage can, which is 15 in. in diameter and 24 in. in hight, is made of galvanized iron. Below this is a cast iron receptacle for holding ashes that accumulate from burning refuse. The ash receiver can be taken out by means of a bail and the ashes emptied into the can. It is not always necessary to bury the garbage receiver in the ground as it operates just as well when placed on the surface. This garbage receiver and refuse burner is made by the Majestic Company, 422 Erie street, Huntington, Ind.

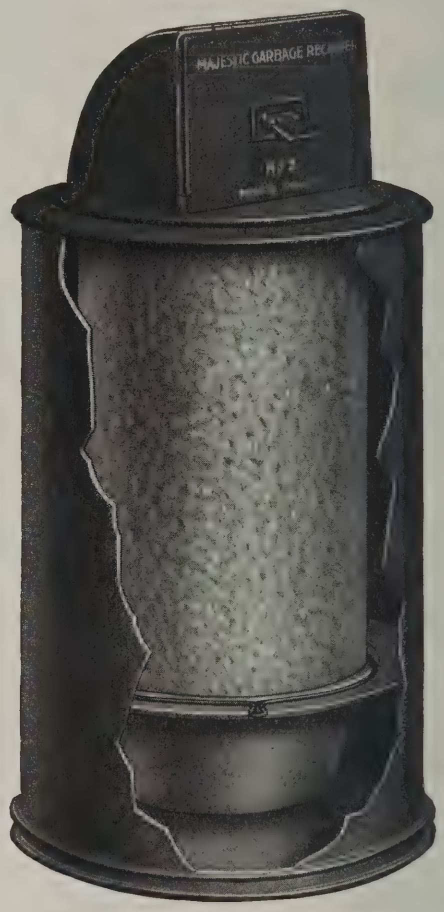


Fig. 10—Broken View of Majestic Garbage Receiver and Refuse Burner

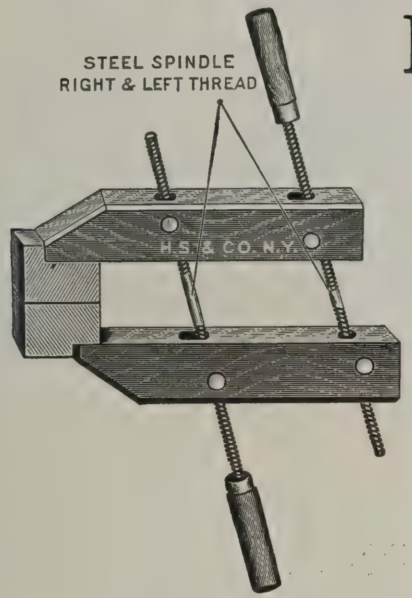
Artistic Treatment of Cement Surfaces

The rapidly increasing popularity of concrete construction in the way of buildings of all kinds as well as of stucco finished houses has naturally brought up the question of the treatment of the exterior cement surfaces with a view to giving them something akin

(*Continued on page 90*)

HERE IT IS!

AN ADJUSTABLE (Jorgensen Patent) HAND SCREW



LOOK AT THE PICTURE!

The steel spindles work in steel sockets that permit of swivel movement while the jaws are *absolutely* rigid when tightened.

There are almost hundreds of positions possible, making the Jorgensen Screw superior to the old style by this immense advantage.

Send for Special Circular No. 3154 and be convinced

HAMMACHER, SCHLEMMER & CO.
HARDWARE, TOOLS AND SUPPLIES
New York, Since 1848 4th Ave. and 13th St.

SARGENT

OUR new Rafter Square, No. 500R, is the most complete Square ever made for the carpenter.

It contains accurate measurements for all kinds of rafters, common, hip, valley, jack and cripple—in the most convenient form.

These measurements are all given on the Square; they are complete, correct and final. They save the trouble of multiplying and dividing and then obtaining a result about which there is some doubt.

Simple and easy to use. A great time saver.

For full description and directions for using send for the Sargent Square booklet, free on request.

SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application.

DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.

Self-adjusting, except turning anvil to change setting

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.
Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.
Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., New York

C. E. Jennings Arrow Head Combination Sets of SAWS
Adjustable Handle

The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set In a Box or Leather Case If So ordered Extra.

We will send a set by parcel post if your dealer cannot supply you.
Send for circular.

No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

Sole Manf's
C. E. JENNINGS & CO., 71-73 Murray St., New York

Goodell Mitre Box

Made of Steel—Cannot Break
First in Quality and Improvements

Automatic Stops for holding up saw.

Corrugated Backs Graduated.

Gauge for Duplicate cuts and many other features.

If you want the best you will take no other.

Send for Circular K.

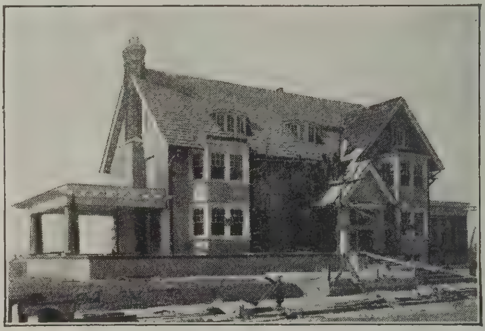
GOODELL MFG. CO., Greenfield, Mass.

Every Carpenter Knows the Ordinary Lengths and Cuts of Rafters. It's the Odd Ones He Cannot Remember.

Our rule not only gives the lengths and cuts of rafters to frame the seven ordinary pitches of roof but gives the lengths and cuts of rafters for SEVENTEEN DIFFERENT PITCHES OF ROOF.
Send for our little Book explaining this rule. It's free.

NICHOLLS MFG. CO. Ottumwa, Iowa

to artistic effect. Many of the leading paint manufacturers throughout the country have endeavored to solve the problem by making a coating applicable to cement and which when applied would give a durable pleasing exterior finish without showing a painted effect and which at the same time would be unaffected by dampness or alkali action. Much thought has been given to the matter by Wadsworth, Howland & Co., Inc., 84 Washington Street, Boston, Mass., and has we understand proven by practical demonstration to the satisfaction of leading architects and building contractors that the base of such a compound must be of a concrete nature. The only medium it is said suitable to such a base is one which does not contain an oil which is affected by alkali and one which would evaporate immediately upon application, leaving the base of the coating an integral part of the surface and not as a skin coating like ordinary paint. The point is made that the Bay State Brick and Cement Coating for cement, concrete, brick and plaster made by this concern is manufactured from such a base and does not turn yellow. This cement coating is offered in many pleasing tints and therefore opens an unlimited field of possibilities for the architect, the contractor or the owner who seeks an artistic, pleasing and harmonious effect on these surfaces. In the accompanying illustrations Fig. 11 represents a residence in Atlantic City, N. J., before being treated with the Bay State Brick and Cement Coating while Fig. 12 shows the same house after it has been treated with two coats of the material in question. The architects of this house were Druckenmiller & Bickley, Philadelphia, and the builder was M. W. Newton, also of Philadelphia, Pa.



Artistic Treatment of Cement Surfaces—Fig. 11—House Before Treatment of Exterior Surfaces

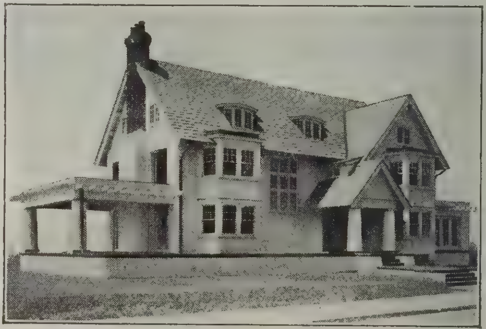


Fig. 12—The Same House After Treatment with Bay State Cement Coating

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An Exhibit at the Panama-Pacific Exposition

The Iron and Steel Industry will be given a prominent place among the various attractions at the coming Panama-Pacific International Exposition at San Francisco next year by a comprehensive exhibit of the United States Steel Corporation and subsidiary companies. A general committee headed by A. T. De Forest of the U. S. Steel Products Company, of San Francisco, has been directing the work, and H. V. Jamison, of the American Sheet & Tin Plate Company, Pittsburgh, has just been appointed Director of Exhibits for the entire

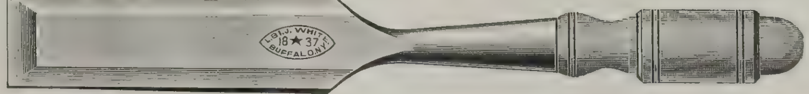
(*Continued on page 92*)

Quality—Not Price

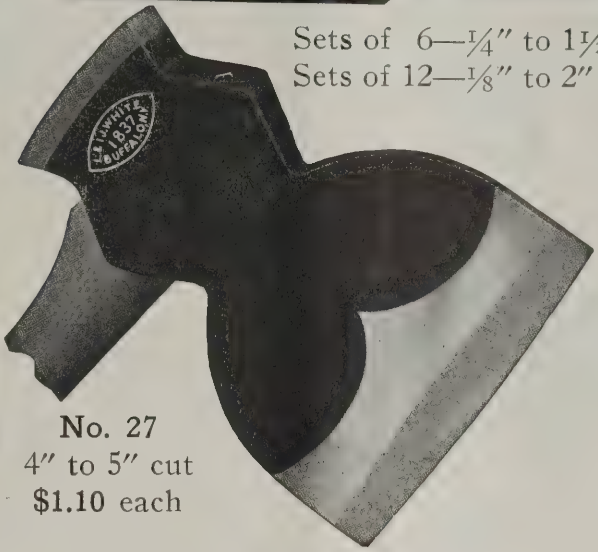
No. 30

4″ to 5″ cut
$2.00 each

No. X2



Sets of 6—¼″ to 1½″ **$4.25**
Sets of 12—⅛″ to 2″ **8.70**



No. 27
4″ to 5″ cut
$1.10 each

Do It Now!

Don't use those poor tools another day. You are wasting your time, your patience and your money, and you can't do the best work with tools that won't stay sharp. You know what the WHITE tools are—the best. You can buy the above tools of your dealer at these prices—if you have any trouble getting them—write us.

The L. & I. J. WHITE CO., 100 Perry St., BUFFALO, N. Y.

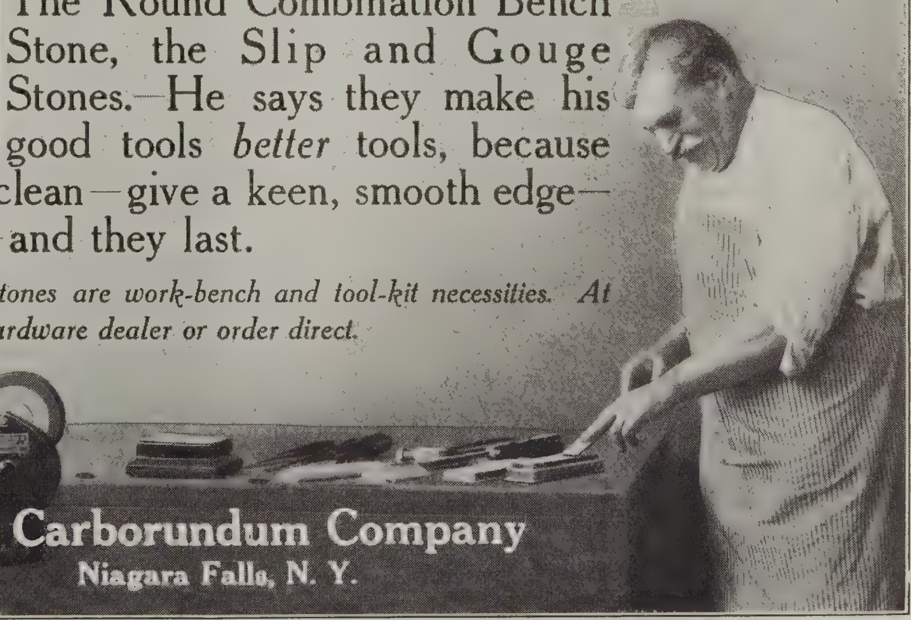
Here is One of Pete's Cronies

A fellow workman in the pattern shop—if there is one thing he prides himself on it is the condition of his tools—so, then, he, too, uses

Carborundum Sharpening Stones

The Round Combination Bench Stone, the Slip and Gouge Stones.—He says they make his good tools *better* tools, because they cut quick and clean—give a keen, smooth edge—never glaze or fill—and they last.

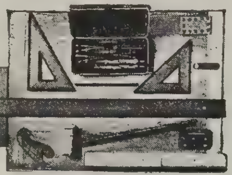
Carborundum Sharpening Stones are work-bench and tool-kit necessities. At your hardware dealer or order direct.



The Carborundum Company
Niagara Falls, N. Y.

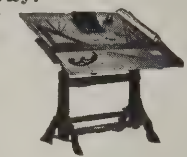
DRAWING OUTFIT, $3.75

Complete, Regular $6.50, Special to Introduce Ourselves to Building Age Readers



Every Carpenter or Builder should have an outfit like this on hand. This outfit can be used for **Designing Any Job You Have,** from a chicken house to a skyscraper; useful to have around buildings while in course of construction.

OUTFIT consists of Board, T-Square, Triangles, Fine Set of Instruments, Scale, Tacks, Pencils, Rubber, Curve, etc. **Money back if not satisfactory in any way.**

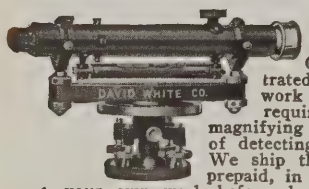


We make a specialty of complete Outfits for the Carpenter and Builder, Architect, etc., with and without Drawing Tables. We make everything ourselves and sell direct. Our prices do not average over half the usual retail price. Send for complete catalogue W. FREE. Remember we guarantee our tools in every way, and we refund money if buyer is not entirely satified or can duplicate our $3.75 special under $6.50 or our other outfit at proportionately higher prices.

Write at Once, NOW, Don't Delay

The T-Square & Triangle Co., Baldwin Bldg., 32 Clinton St., Newark, N. J.

WHITE'S IMPROVED LEVEL



Shipped on Approval

Our No. 2011 improved level, illustrated herewith, is especially designed for work where a general purpose level is required. Telescope is 12" long with magnifying power 25 diameters and is capable of detecting an error of 1/16-inch in 300 ft. We ship this level out on approval, express prepaid, in order that you may try it out on your own work before deciding to keep it. Ask today for your circular X and special net price sheet. Ask today!

DAVID WHITE COMPANY
Dept. B, 419 E. Water Street Milwaukee, Wis.

No. 0 PERFECTION

Our vest pocket edition for Carpenters, Plumbers and households; fitted with 4-inch Corundum Wheel. Weight 5 lbs.

Mr. Carpenter, just think for **$2.50** you can carry in your pocket a complete sharpening outfit. No dirt—no grease. If your dealer does not carry them, we will send prepaid on receipt of price. We also make six other sizes.

STAR SPECIALTY MFG. CO.
227-233 W. Erie St., Chicago

Don't

adjust yourself to straight or bevel filing. Adjust this Huther Bros. Vise. Quick Adjustment, Rigid and Strong. Sent on approval. Try one?

Have you a Huther Dado Head?

Huther Bros. Saw Mfg. Company
2500 University Ave., Rochester, N. Y.

corporation and at present is busily engaged mapping out plans for the exhibits of the various companies. Among the features which will be shown will be the process of manufacturing iron and steel products, from the mines where the ore is taken out of the ground to the production of the hundreds of products of the corporation. It is intended to show how the ore is transported both by rail and water, the dock operations, the production of coal, coke and pig-iron and thence to the specialized lines of manufacture. The exhibit will even go so far as to show how the by-products are produced and will show many products in practical use.

A motion picture show will be part of the exhibit and through this medium will be portrayed the operations of the corporation throughout all its departments. In the picture will also be shown the great benefit to the social world brought about by the United States Steel Corporation, as no other institution does more to further the social welfare of its employees. The Corporation's many devices for insuring safety of employees will be exhibited and data will be given as to the enormous amounts expended for this purpose.

TRADE NOTES

Frank Gould, who recently resigned as sales manager of Henry Disston & Sons, Inc., Philadelphia, Pa., became president May 1 of the Bishop Company, which takes over the business of George H. Bishop & Co., saw manufacturers, Lawrenceburg, Ind. Charles R. Bishop retires while Charles E. Bishop, Jr., will continue to take an active part in the business. Mr. Gould has been in the employment of the Disston house from the time he was 11 years old, starting in as an office boy.

The annual meeting of the Joseph Dixon Crucible Company was held at the company's office in Jersey City, N. J., April 20. There was a large attendance of stockholders, who expressed their satisfaction with the management and re-elected the board of directors as follows: George T. Smith, William Murray, George E. Long, E. L. Young, William G. Bumsted, J. H. Schermerhorn and Harry Dailey. The officers elected by the board of directors are: President, George T. Smith; vice-president, George E. Long; treasurer, J. H. Schermerhorn; secretary, Harry Dailey; assistant secretary and assistant treasurer, Albert Norris.

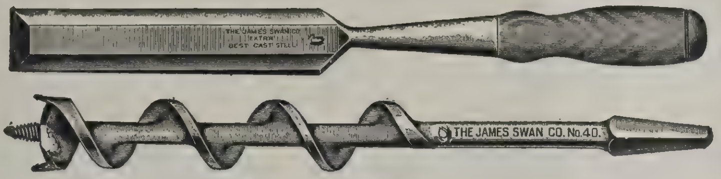
"The A B C of Interior Decoration" is one of the leading features of a recent issue of "Varnish Talks"—the house organ of Pratt & Lambert, 100 Tonawanda street, Buffalo, N. Y. Other interesting articles tell how to finish concrete and how to paint a bath tub.

T. L. Smith Company, 3120 Hadley street, Milwaukee, Wis., makes announcement of the fact that it has taken over the Chicago mixer formerly sold by the Chicago Concrete Machinery Company, and hereafter it will form a part of the regular line of the T. L. Smith Company. This particular machine we understand has been entirely re-designed and will be known as the "Smith-Chicago Mixer."

Kewanee Mfg. Company, Kewanee, Ill., held its annual meeting early in April when officers for the ensuing year were elected as follows: President, Dr. H. J. Stewart; vice-president, B. S. Wallick, and secretary and treasurer, John R. Collette. The results of the business during the past year showed a gratifying increase, and to the stockholders who were present the reports for the past twelve months were a pleasing surprise. The busiest season of the year for the company is now at hand and the company has installed some additional machinery in order to promptly handle the orders which are coming in.

The last issue of *J-M Roofing Salesman,* which is the house organ of the H. W. Johns-Manville Company, Cleveland, Ohio, contains a number of interesting halftone engravings showing work in connection with which either J-M asbestos roofing or J-M asbestos shingles have been used. The most striking picture is the armory and gymnasium building of the Ohio State University at Columbus. Another impressive picture is that of the Michigan Boulevard Building in Chicago,

(*Continued on page 94*)

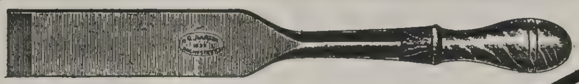

THE JAMES SWAN CO. No.40.

LOOK FOR THE "SWAN" TRADE MARK

On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.



MACK & CO.

The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

D. R. BARTON 1832 ROCHESTER N.Y.

Brown's Race
Rochester, N.Y.

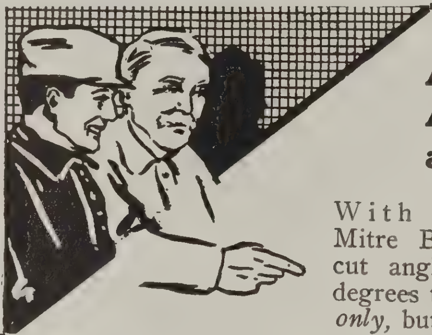
DUMB WAITERS

Some jobbing carpenters make good money on Dumb Waiters and Hand Power Elevators: Do you?

There is money in this line providing you satisfy your customers: The way to satisfy them is to furnish those outfits which will best fill their requirements.

The Sedgwick Machine Works
87 Carroll St., Poughkeepsie, N. Y.
(New York Office: 123 Liberty St.)

show many types in their new catalog "L" (all of which are carried in stock for prompt shipment) and will submit drawings and specifications on either standard or special outfits free of charge. Get their catalog "L" at once and study it over.

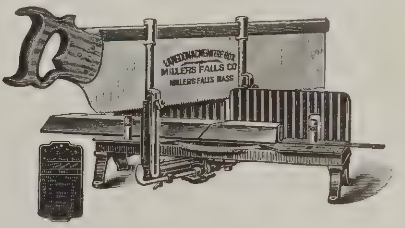


Any Angle in a Second

With an ordinary Mitre Box you can cut angles from 45 degrees to 90 degrees *only*, but with the

Langdon Acme Mitre Box Improved

you can also cut angles on 2½-inch stuff from 15 degrees to 90 degrees. This helps on lots of work—extends the scope of the Mitre Box and so gives you more for your money, for the value of a tool is largely measured by what it will do, and the Langdon Acme Improved will do more than other Mitre Boxes, hence is worth more.



Ask your dealer. Most good dealers handle Millers Falls tools. If yours does not, write us and we'll send you the name of a dealer who does, together with a copy of our *New* Catalogue.

Millers Falls Co., Millers Falls, Mass.

Reynolds Asphalt Shingles

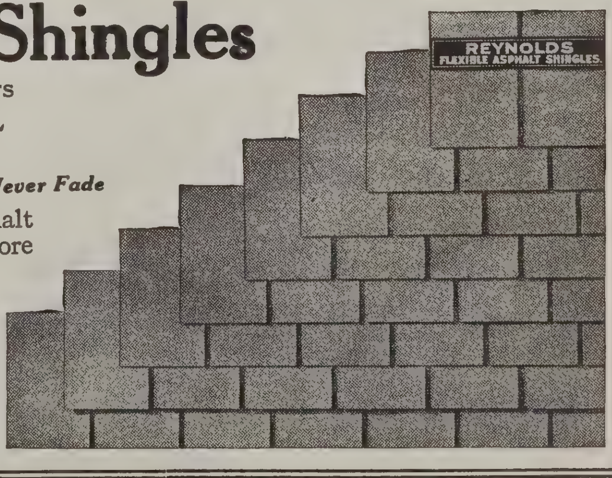
ENDORSED BY LEADING ARCHITECTS

GUARANTEED FOR 10 YEARS—WILL LAST MANY YEARS LONGER

Natural Colors of Garnet, Red, Gray and Green, Which Never Fade

We are the ORIGINAL MAKERS of Flexible Asphalt Shingles and tested our product for ten years before putting it on the market. Let us send you a booklet.

H. M. Reynolds Asphalt Shingle Co.
West Grant Street Grand Rapids, Mich.
Established 1868


REYNOLDS FLEXIBLE ASPHALT SHINGLES.

TO MANUFACTURERS

Would like to arrange with good high-grade manufacturers to represent them in selling capacity for Cincinnati and vicinity. Must be material or product of merit that will sell. Am thoroughly reliable and able to finance my own operations. Prefer something that runs into hundreds rather than tens. Will consider salary or commission, or both.

L. JAY CAMPBELL, Manufacturers Selling Representative
Main and Canal, Cincinnati, O.

THERE'S no possible chance for confusion and misunderstanding about

DIXON'S SILICA GRAPHITE PAINT

It is made in *one quality* only—four colors —fifty years. Booklet 32-B.

Made in Jersey City, N. J.
Joseph Dixon Crucible Co.,
Established 1827

READY MIXED DIXON'S SILICA-GRAPHITE PAINT ONE GALLON FOUR COLORS JOSEPH DIXON CRUCIBLE CO. JERSEY CITY, N. J.

THE IDEAL WAY TO BUILD

Use a Van Guilder Hollow Wall Concrete Machine

It builds double monolithic walls tied together and steel reinforced. Continuous air space, dry, warm, sanitary, fire proof, age proof, repair proof.

Better than brick, cheaper than wood.

Large illustrated Catalogue and Book "How to Build" free.

VAN GUILDER HOLLOW WALL CO.
712 Chamber of Commerce Bldg., Rochester, N. Y.

STOP THOSE RATTLING WINDOWS

Do away with sash weights, cords, pulleys and pocket frames and save money by using

AUTOMATIC SASH HOLDERS

Proved by Use—Unexcelled for windows without pocket frames. Excellent for new windows.

Send for circular and prices, or $1.00 for trial set prepaid; state approximate weight of sash.

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which is covered with 12,800 sq. ft. of three-ply J-M asbestos built-up roofing applied over concrete.

Bridgeport Wood Finishing Company, New Milford, Conn., is distributing among its friends in the trade an illustrated folder carrying sample colors in which Bridgeport Standard Prepared Paint is furnished. This paint is made full body and is said to have great covering capacity—features which cannot fail to be appreciated by the practical painter. It is referred to as "the paint that lasts" and it has behind it the reputation of the company which covers more than 40 years in the manufacture of high grade paint and wood finishing products. Those of the readers of *The Building Age* who are thinking of painting their houses will find much that is interesting to read in the booklet which the company has issued entitled "Modern Painting for Beauty and Protection," a copy of which can be secured free on application to the company.

The May number of "The Medusa Review," which is the house organ of the Sandusky Portland Cement Company, Sandusky, Ohio, carries a number of attractive half-tone illustrations of buildings in connection with which Medusa Cement has been used. These range all the way from the neat and attractive story and a half cottage to factory buildings, power houses, post offices, etc. The concluding pages are devoted to a summary of the results of the first conference on concrete building which occurred in Chicago early in the year.

The Lufkin Rule Company, Saginaw, Mich., is making all of its tapes with a steel case liner and a push-button opener for the winding handle for those tapes that have a leather case, while the tapes contained in a nickel-plated steel case have the push-button opener and the edge or case band is knurled to give a firm hand hold. It is stated that by using a steel case liner for the leather cases it is possible to decrease the width of the case by ⅛ in., thus making it more compact.

A. J. Cropp & Co., makers of the Cropp Concrete Mixer, occupied new quarters on May 1 at 1840-2 Carroll avenue, Chicago, Ill. This concern makes what is known as a double chamber drum mixer embodying some unusual features which cannot fail to command the attention of building contractors who have occasion to do any considerable amount of concrete work.

At the recent convention of the National Builders' Supply Association held in Chicago, Ill., Edward M. Hagar, president of the Universal Portland Cement Company, delivered a very interesting address on "Dealers' Profits," the subject matter having to do with dealers in cement and other builders materials.

Condron Company, Monadnock Building, Chicago, Ill., shows in its Bulletin No. 4 illustrations and descriptions of 16 warehouses and factories selected from among those erected on the company's "Akme System." The reinforced concrete construction of these buildings was designed by the company as consulting engineers to the owners or architects, whose names are given in connection with the illustrations. Bulletin No. 3 issued by the company describes 11 buildings for the Ford Motor Company.

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THE BUILDING AGE

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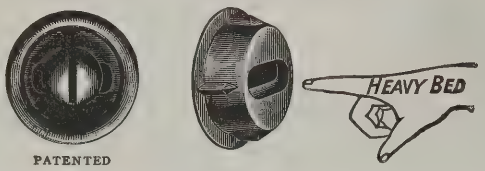

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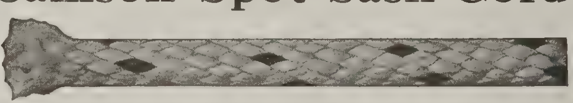

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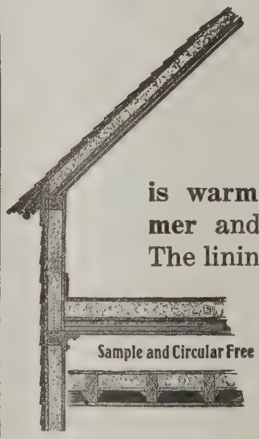

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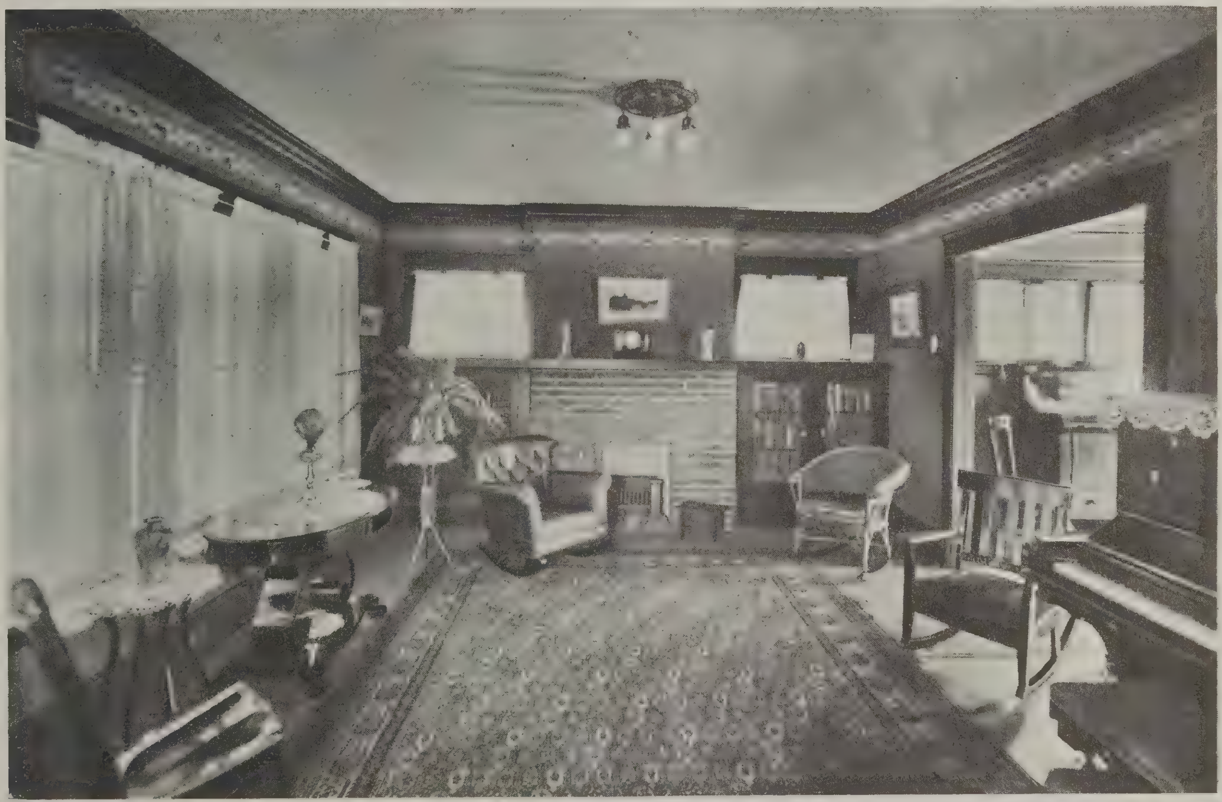
THE BUILDING AGE

NEW YORK, JULY, 1914

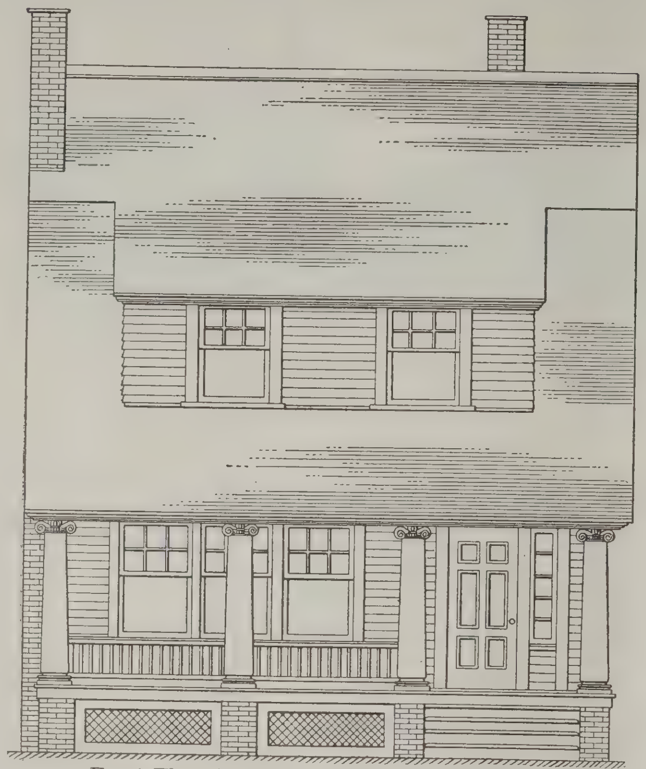
A Low Cost Cottage at Lakewood, Ohio

The Outside Chimney a Feature—An Arrangement of Six Rooms and Bath—Cost $2,500

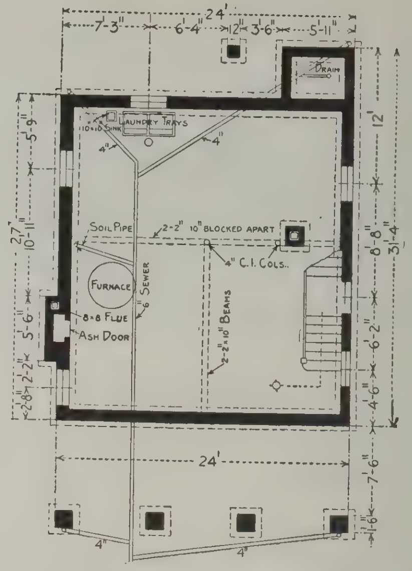
A LARGE number of artistic dwellings of various types have recently been erected at a comparatively low cost in Lakewood, Ohio, one of the many attractive suburbs of the city of Cleveland, and upon this and the pages which follow we illustrate one of these cottages, Dutch Colonial in its type of architecture and said to have cost about $2,500. The plan is such that it can be used as the basis for many variations of exterior treatment—a common practice where the houses are of low cost and designed to meet the requirements of people in moderate circumstances. Considering the ground area, the interior arrangement is such as to command attention, utilizing as it does every foot of space and at the same time giving all the rooms ample light from the outside. As in other types of Dutch Colonial cottage the upper portion of the roof is built out in an unbroken plane to the edge of the dormers. The upper sash of all the windows is fitted with three lights of glass, while the lower sash consists of a single light, thus giving a pleasing effect both from the exterior and



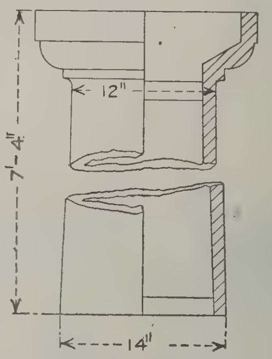
The Living Room of the Cottage of Mr. H. K. Stohlman Looking Toward the Fireplace and Giving a Glimpse of the Dining Room at the Right



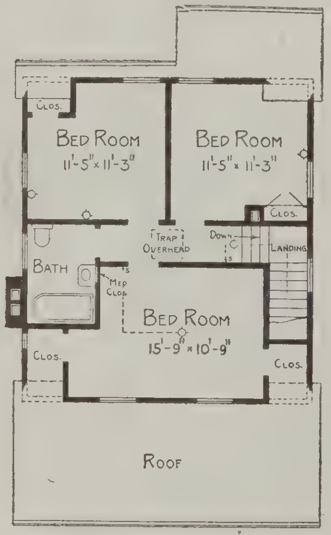
Front Elevation—Scale ⅛ In. to the Foot



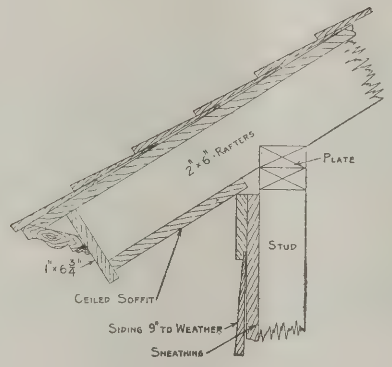
Foundation Plan Showing Location of Laundry Tubs, Furnace, etc.—Scale 1/16 In. to the Foot



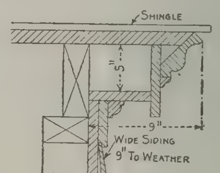
Detail of Porch Column—Scale ¾ In. to the Foot



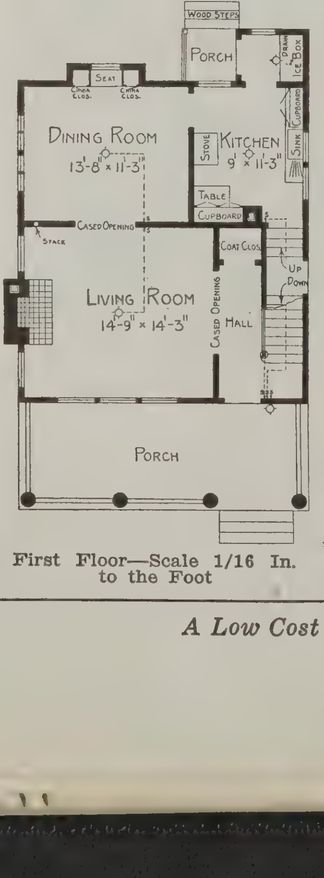
Second Floor—Scale 1/16 In. to the Foot



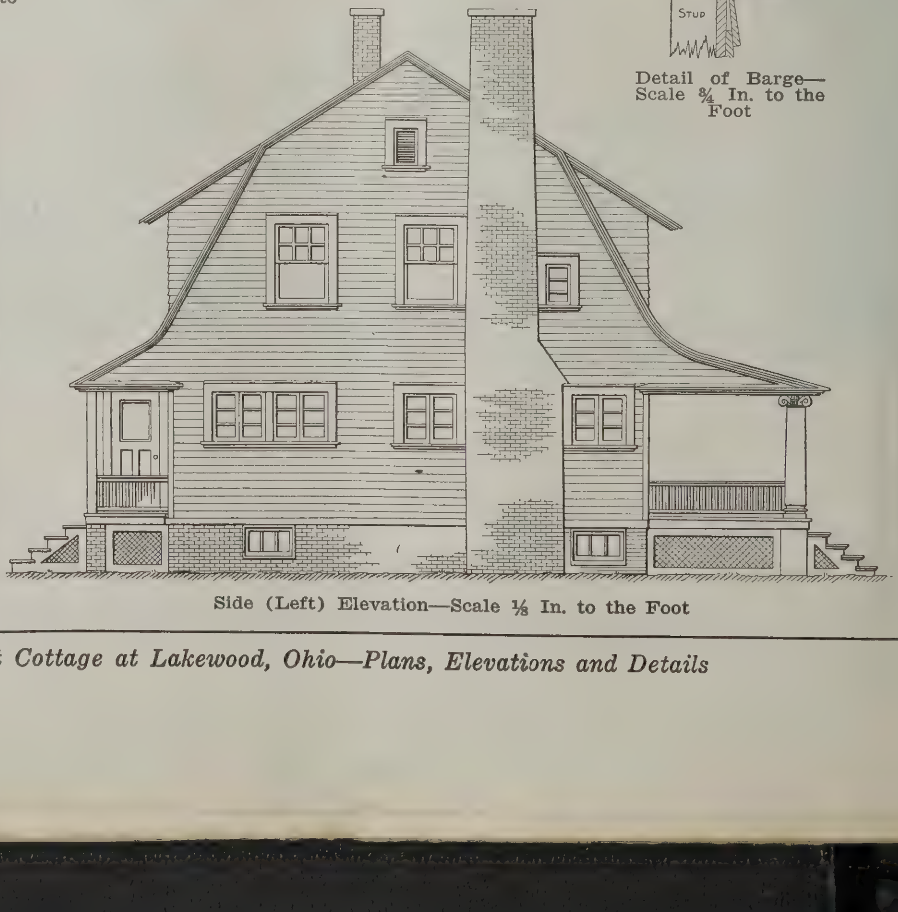
Details of Main Cornice—Scale ¾ In. to the Foot



Detail of Barge—Scale ¾ In. to the Foot



First Floor—Scale 1/16 In. to the Foot



Side (Left) Elevation—Scale ⅛ In. to the Foot

A Low Cost Cottage at Lakewood, Ohio—Plans, Elevations and Details the interior. Across the front of the house is a wide porch and one of the brick chimneys is so placed as to render it a feature of the exterior treatment of the side elevation.

On the first floor there are living room, dining room and kitchen, and on the second floor three bedrooms and bath as shown on the plans, but there is no attic. Rising from a point in the main hall near the front door is the stairway leading to the upper rooms. At the end of the main hall is a coat closet, the door of which is provided with a large panel mirror. At the left through a cased opening one enters the living room, the feature of which is the open fireplace built of an inexpensive wire-cut brick laid up in white mortar. It is lined with fire brick laid in fire clay mortar on both side jambs and across the rear. On either side of the fireplace are bookcases built up to the top of the fireplace and there is a mantel 11½ in. wide extending across that side of the room over the fireplace and bookcases. Ample light is furnished by a window placed directly above each bookcase.

A view in the living room is afforded by means of one of the half-tone engravings accompanying this article. Beyond the living room and communicating with it through a cased opening is the dining room, well lighted by windows on two sides. The four-part window in the left wall of the room is sufficiently high to permit of the placing of a buffet beneath it as will be seen in the picture of the living room with dining room at the right. On each side of the rear window in the recess is a china closet and beneath the window seat are linen drawers. The interior arrangement of the dining room is well shown in one of the half-tone pictures presented herewith. It also clearly indicates the position of the plate rail extending around the walls.

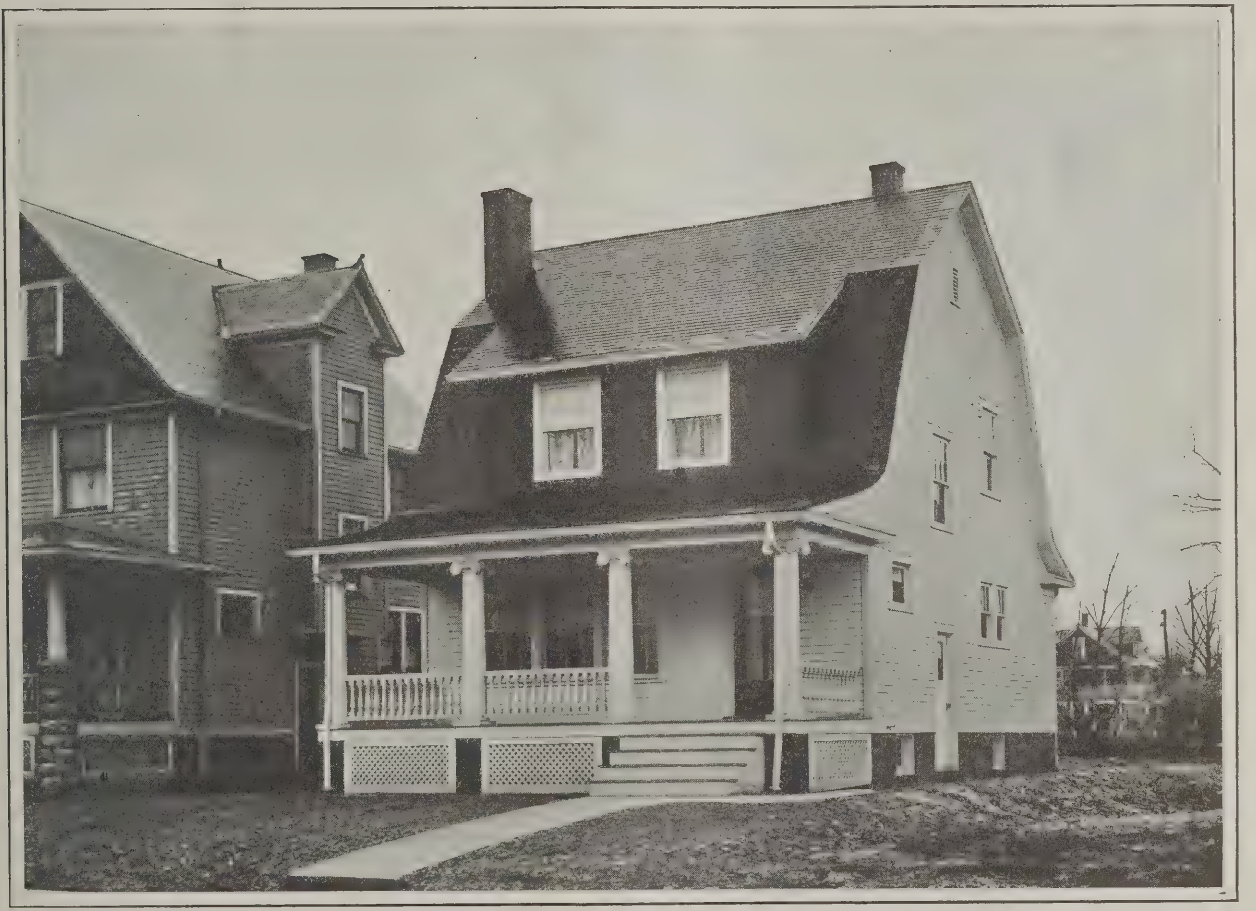
At the right of the dining room and communicating with it by means of a double swing door is the kitchen. This is equipped with cupboards, sink, table, stove, etc., the sink being placed directly under the window where it has a good light. The kitchen may be reached through the rear entry from the porch and it has space for the refrigerator, as indicated on the plan. The position of the refrigerator is such as to render it convenient for icing without the necessity of passing into or through the kitchen; at the same time it provides a cool place for kitchen supplies during the winter.

There is an entrance at grade at the side of the house from which four steps rise to the kitchen level and opposite these are the cellar stairs.

The basement has a cement floor 3 in. thick laid on a bed of broken stone. Two inches of the floor is composed of a mixture of one part Portland cement and six parts sand. The top coating, 1 in. thick, consists of a mixture of equal parts cement and sand.

The footings are of concrete composed of a mixture of one part Portland cement and six parts sharp coarse sand and gravel. The foundation walls and piers except the outside facings are built of hard burnt hollow tile. Rough cut shale brick is used for the outside facing of the chimney and porch piers.

The first and second floor joists are of 2 x 8-in. yellow pine and the ceiling joists are 2 x 4-in. hemlock, all placed 16 in. on centers. The beams are of



Cottage of Mr. H. K. Stohlman at Lakewood, Ohio—Architects, J. H. Newson Company, Cleveland, Ohio

2 x 10-in. yellow pine spiked together. The rafters are 2 x 6-in. hemlock placed 16 in. on centers. The collar ties are 2 x 4 in., as are also the studs, the latter being placed 16 in. on centers. At all corners and angles the studs are doubled, nailed together and braced. All openings of 5 ft. and over are trussed, as are also all bearing partitions.

The exterior frame is sheathed with ⅞ x 6-in. hemlock shiplap over which is placed a heavy layer of building paper, this in turn being covered with 6-in. poplar lap siding exposed 4½ in. to the weather. The rafters are covered with ⅞ x 6-in. matched hemlock surfaced on one side. These in turn are covered with green roofing slate laid 4½ in. to the weather.

The front porch and steps are of 1⅛ x 2¼-in. cypress. The porch has a ⅞ x 2¼-in. beaded ceiling and the steps have 1⅛ x 10-in. treads and ⅞ x 7-in. risers.

With the exception of the kitchen the floors of the first story rooms are of ⅞ x 2¼-in. selected oak. The kitchen floor and those of the rooms in the second story are of yellow pine. All interior trim except in the kitchen is birch, as are also the built-in bookcases, the mantel and the china cabinets.

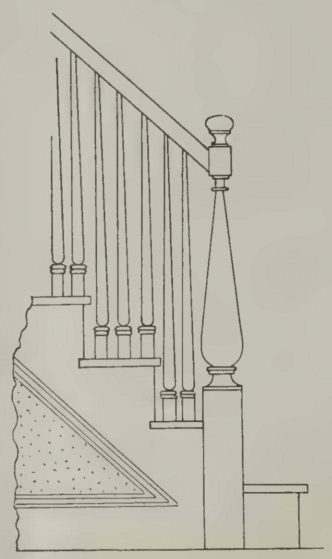
The inside stairs are built of 1⅛ x 10-in. oak with ⅞-in. risers. The basement stairs have 2-in. surfaced treads but are built without risers.

The oak floors were given one coat of filler, one coat of shellac and two coats of wax, while the floors in the second story received one coat of shellac and two coats of floor varnish.

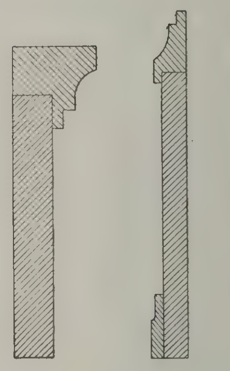
The interior woodwork on the first floor was given one coat of stain, one coat of shellac and two coats of varnish. The second floor woodwork received three coats of white lead and oil and two coats of white enamel. The yellow pine trim in the kitchen was given one coat shellac and two coats varnish.

The outside woodwork and all exposed tin received two coats of pure linseed oil and white lead in addition to the priming coat. The porch ceilings were given two coats of linseed oil stain.

The house is heated by means of a Moncrief warm air furnace with a 22-in. fire box and 8-in. smoke pipe made by the T. E. Henry Furnace Company, Cleveland, Ohio. The cold air is taken in from the basement through a 22-in. duct. A 3½ x 10-in. riser runs up in the partition between the kitchen



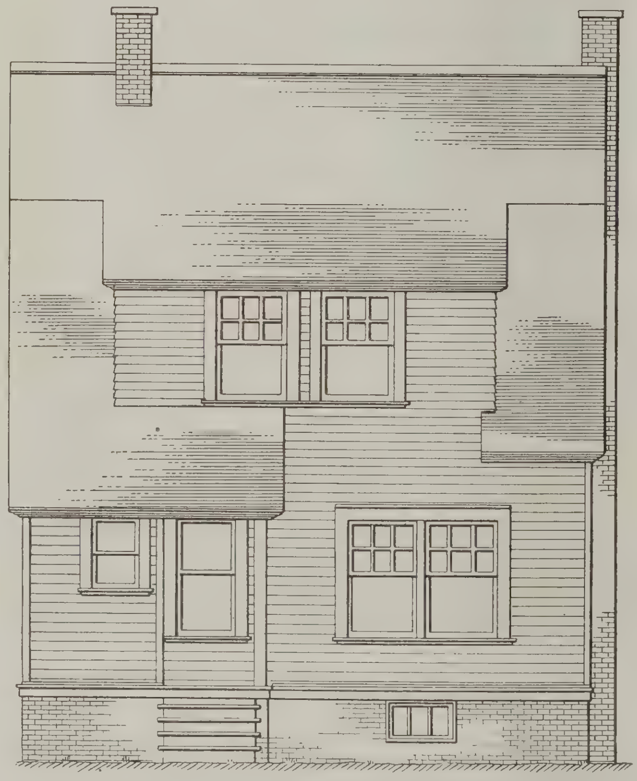
Detail of Main Stairs and Newel Post—Scale ½ In. to the Foot



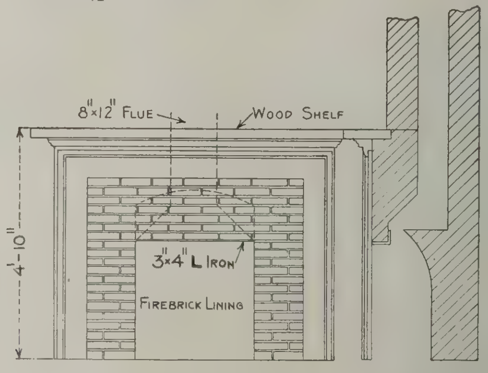
Head Casing

Base and Cap

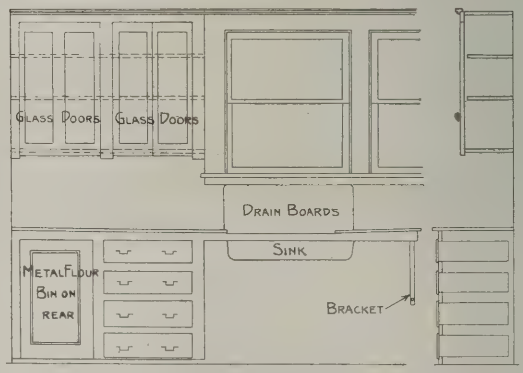
Scale 3 In. to the Foot



The Rear Elevation—Scale ⅛ In. to the Foot



Elevation and Section of Open Fireplace—Scale ¼ In. to the Foot



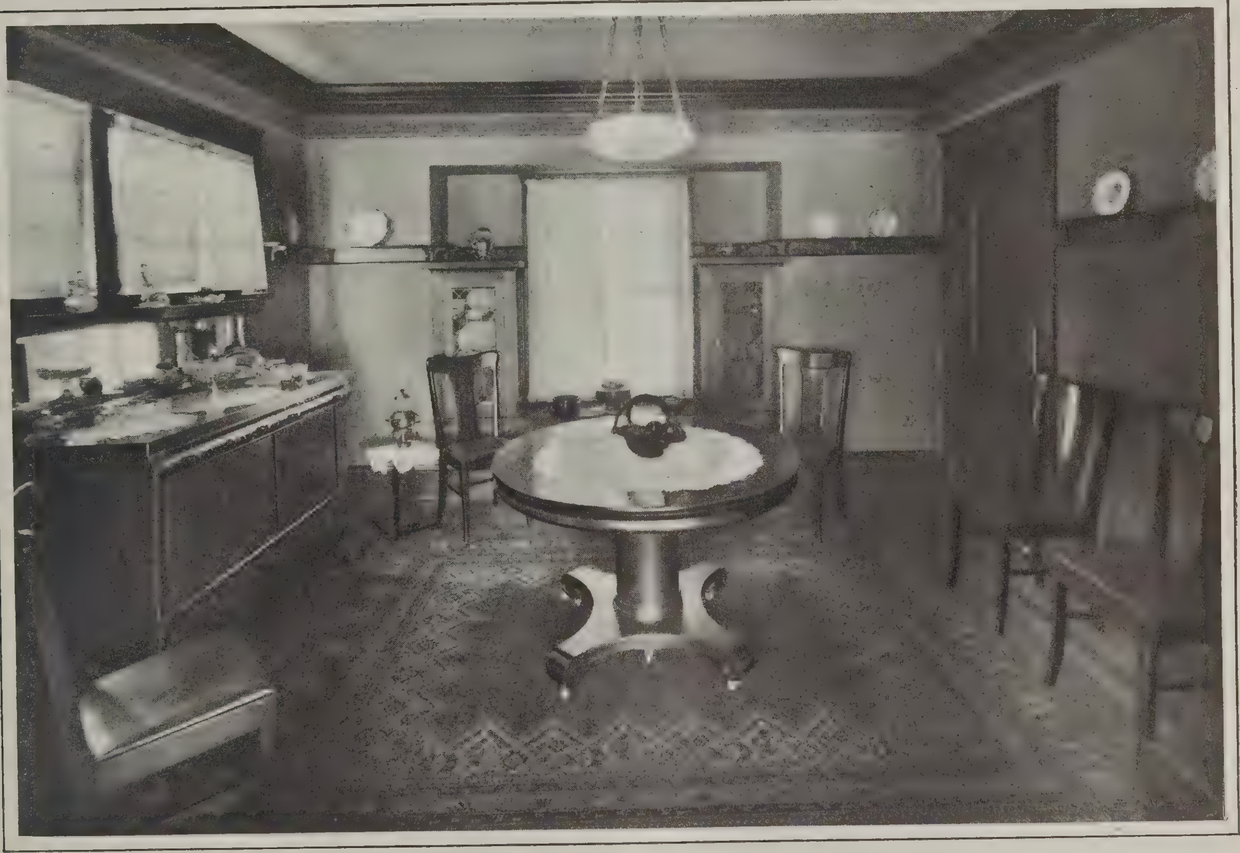
Detail of Kitchen Cupboard—Scale ¼ In. to the Foot

A Low Cost Cottage at Lakewood, Ohio—Elevation and Miscellaneous Construction Details and dining room and another of the same size in the partition between the dining room and living room, for the purpose of supplying the registers on the second floor. There are 9 x 12-in. registers to heat the kitchen and dining room and a 12 x 15-in. register in the floor of the living room just at the right of the cased opening between living room and dining room. Two of the bedrooms and the bathroom on the second floor have 8 x 12-in. registers, while the bedroom directly over the kitchen has an 8 x 10-in. register.

The plumbing was installed according to the rules and regulations of the state and city ordinances. The water supply is taken through a ¾-in. riser to the sill cocks, tank and heater, sink, bath room and laundry trays, and hot water runs of similar size are provided from the hot water tank to the sink, the laundry trays and the bathroom. The bathroom is fitted with a 5½-ft. vitreous china tub, oval lavatory and closet with enameled tank. In the basement is a 3-part cement laundry tub. Hot water is supplied from a 30-gallon galvanized tank which is heated by an Augmore heater made by the Augmore Mfg. Co., Cleveland, Ohio.

The house is wired throughout for electric lighting, the fixtures being of attractive design. The fixture in the dining room provides what is commonly known as semi-indirect lighting.

The cottage here illustrated and described was built for H. K. Stohlman and is located at 1188 Virginia Avenue, Lakewood, Ohio. It was built in accordance with plans prepared by the John Henry Newson Company, architects, with offices in the Williamson Building, Cleveland, Ohio. The construction work was done under their supervision.



View in the Dining Room of the Cottage of Mr. H. K. Stohlman at Lakewood, Ohio, Looking Toward the Recessed Window

The American System of Building in Australian Architecture

There is a growing inclination to introduce into Sydney's domestic architecture the American methods of placing fittings in all the rooms of a house. In fact, furnishing the cottage or the mansion to such an extent that the tenant will need little furniture, and the landlord will not have the walls destroyed and the place otherwise knocked about by the removal of large furniture.

The American system is to provide as fixtures, wardrobes, washbasins, cupboards, linen presses, etc. In fact, everything in the way of large furniture is a fixture in the house, and it is arranged on the latest and most up-to-date principle and to an artistic design. In fact, says the *Sydney Herald,* it resembles good furniture, and is a means of adornment in any home. The incoming tenant simply requires a table, and chairs for the dining room, and a bedstead, etc., for the bedrooms. Hot and cold water is provided in every room, and electricity is largely used for lighting and cooking.

The floors are in parquet form to different designs, stained and polished, thus doing away with carpets. A few doormats and a rug or two is all that is required.

With a view of experimenting in this style of building homes for the people, a contract has been let in the office of Clarence Backhouse, architect, to erect a block of flats at Neutral Bay for F. A. Thomas. These will be fitted out on the most up-to-date American style. In one or two other instances of building residences around Sydney similar methods are being employed.

Beauties of the Modern Skyscraper

What "Twells Brex," in a Recent Issue of "London Telegraph," Has to Say Regarding American Architecture

ONE assumes that the chief objection to the skyscraper is not so much against itself as against its incongruity with lowlier neighbors. Perhaps any skyscraper—unless it be such an inspiration as New York's Woolworth Tower—is unlovely if it stands alone in an undergrowth of five story buildings. But when an old building comes down on the priceless space of Lower Manhattan a mammoth building goes up as a matter of course. The steel and stone giants are no longer nakedly alone. They cluster in kingly groups and line whole streets like halls of the Nibelungs.

No single unit of man's audacity and skill, the leviathan ship, the Nile dam, the Simplon tunnel, is more triumphantly self-complete and self-justified than that beautiful Woolworth Tower, with its flying buttresses, its gilt-touched roof, its spire of crocketed gold, its white uplift by day, and its sky beacon by night. It captures your imagination when you see it from afar, it draws you again and again while you remain, it is your abiding memory and symbol of New York.

The conception of a New York skyscraper is often of a stark rectangular rearing up in unbroken lines, almost showing its geometrical steel ribs under a lean flesh of unrelieved stone. There are enough of such buildings in New York, but they were only the raw beginnings out of which have been evolved the Metropolitan Tower, the astounding massivity of the Plaza Hotel, the giant horseshoe of the new civic buildings, the Bankers' Trust Building with its air-borne pilasters and pyramidal roof, the Candler Building, rocketing above Times Square at night in lines and cornices of fire, the cloud-aspiring Singer Building, and—last of all, until the next daring—this Woolworth Tower, the highest inhabited building in the world, seven hundred and eighty feet in all, whose summit I have known literally hidden in October storm-scud.

And they are towns in themselves, these New York office buildings, housing two, five, and ten thousand people under one roof. Their vast height is often based on a whole city block. They have within them the organization of a municipality, their own electric light, water, and power plants, and a fire-fighting equipment that is almost supererogation, because they are as nearly fireproof as the wit of man can devise. In the whole of the Woolworth Building there is no woodwork. The doors and partitions are of steel, terra-cotta and wire-glass. The frame of the building is a gigantic and homogeneous steel cage, the beautiful walls and ornaments are laid on as a skin. Beams and ceiling arches are of steel, floors are concrete, stairways are stone or metal. The fiercest blizzard of New York's harsh winter would not shake the skyscraper by a tremor, for it has been built to withstand the impossible pressure of a wind of two hundred and fifty miles an hour.

Whatever you may think of their external artistry you cannot fail to be conquered by the internal complexity, efficiency and completeness of these commercial palaces of New York. It has been truly vaunted that a tenant need not go from under his roof for almost any civilized want. He has, of course, the enviably competent telephone service of New York, and he can mail his letters in a chute on his floor. He has a post and telegraph office, a restaurant, a bank, an insurance office, a safe deposit, and even his own uniformed police. He can visit his physician, lawyer, broker, tailor, tobacconist, barber and shoeblack. He can buy papers, books, stationery, theater tickets, hosiery, hats, fruit, flowers and candies without passing his main entrance.

Some of these vast buildings are open day and night, the cost of maintenance alone reaching £20,000 a year, and the one item of water supply £1,000. The Woolworth Building has 40 acres of floor space, 3,000 exterior windows, 80,000 electric lights, and 28 lifts. Twenty-four thousand tons of steel went into the construction, 17,000,000 bricks, 87 miles of electric wiring and 43 miles of piping.

These are but figures and no figures can so touch the imagination as an ascent to the top of New York's latest and greatest skyscraper. It is infinitely more suggestive than the ascent of the slightly higher Eiffel Tower. The Parisian wonder is in engineering curiosity, a mighty skeleton reared for the sightseer, tenantless except by tourists and meteorologists. This tower of New York holds thousands of citizens who pass their work-a-day hours in all its fifty-five stories—people who sit at their desks and unheed by familiarity the most astonishing city view of the world. The stranger pays 50 cents and steps into the express elevator. Nothing here of the tedium and change of lifts of the Eiffel Tower; the flash to the summit takes exactly one minute. It is one of the cheapest and most exhilarating two shillingsworth imaginable. The fifty-five floors fall past you like cards dropping from the hand of a juggler, streaks of alternate light and shade.

And the view from the high-borne eyrie—all the amazing city—the encompassing rivers—the busiest harbor in the world—the Olympic dwarfed to a channel steamer—the Narrows beyond—and then the wide roll of the Atlantic—it hangs for ever afterwards in the memory like a great picture in a gallery.

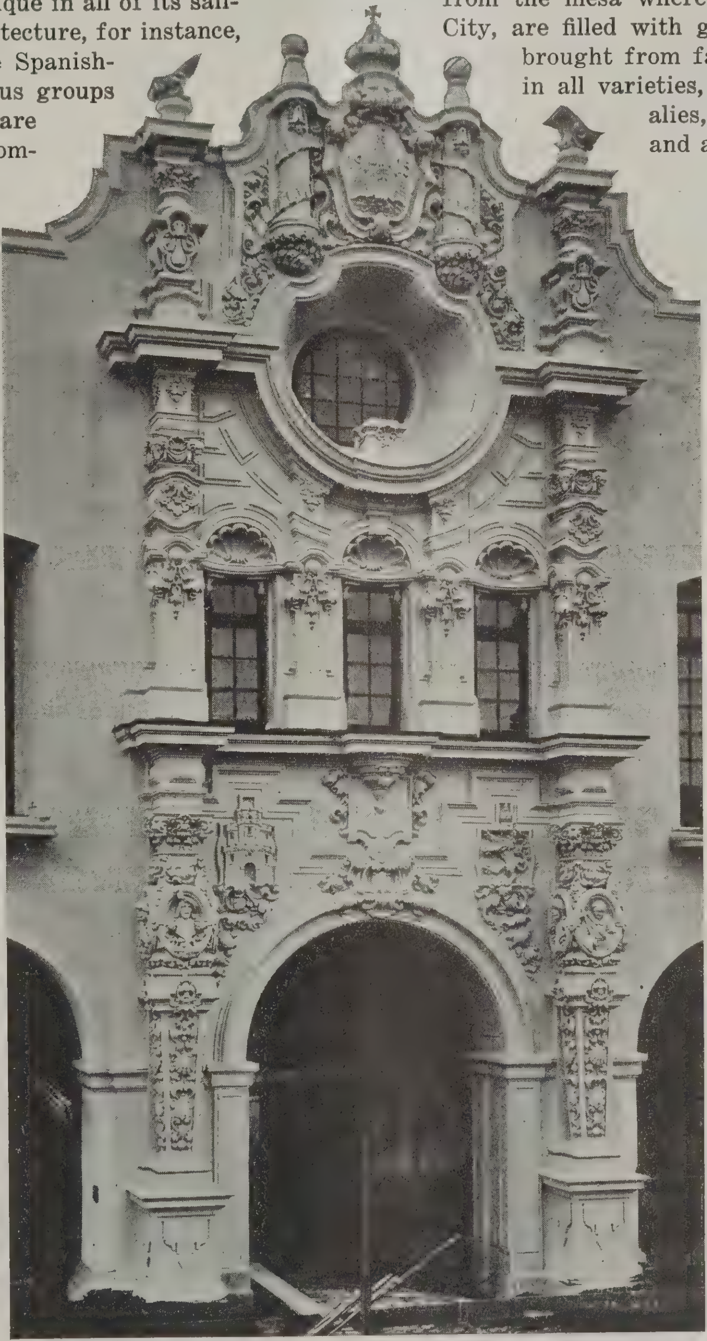
The Coming Exposition at San Diego

The Groups of Exhibit Buildings so Arranged That in Their Entirety They Resemble a Medieval European City

THE Exposition that is now being built in San Diego, Cal., for the celebration throughout the entire year of 1915 of the opening of the Panama Canal, though small in comparison with some expositions of the past, will at least have the distinction of being unique in all of its salient features. Its architecture, for instance, is all of one type, the Spanish-Colonial, and its various groups of exhibit buildings are so arranged that the completed whole will be like a medieval European city, in a setting of tropical verdure.

A great concrete viaduct with seven arches leads to the main entrance to the grounds, over a canyon 150 ft. in depth, in the bottom of which is a tiny lake. The California State Building stands immediately within the grounds at this place, a great pile of reinforced concrete, its tall tower and openings surrounded with profuse ornamentation, the casts for which were taken from famous cathedrals and palaces of the Old World. Joined to it by a series of arches forming the main entrance to the Exposition, is the huge structure, also of concrete, that will house the exhibit of archæology prepared for the San Diego Exposition by the Smithsonian Institution. The Prado begins here and stretched along on either side of it are great exhibit buildings, all of the same architectural type, and the same coloring.

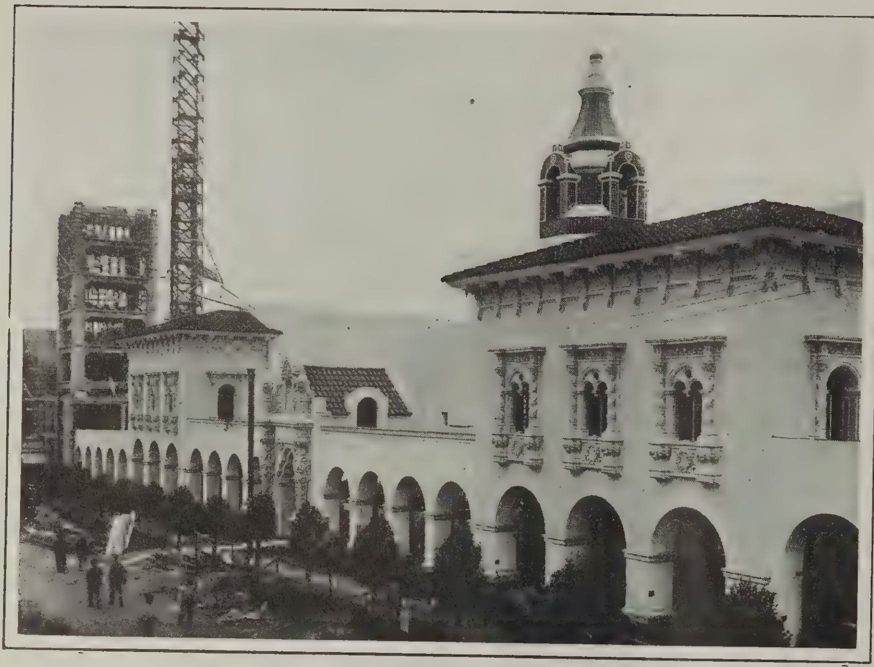
The officials of the Exposition in San Diego say that it will be the most beautiful exposition ever opened. Not content with the natural beauty of the surroundings, they have undertaken to make of the great park of fourteen hundred acres, in the midst of which the Exposition will set, a fairyland of flowers. The slopes of the canyons which lead down from the mesa where rests the Exposition City, are filled with giant palms and ferns brought from far countries. Acacias in all varieties, tall eucalyptus, grevalies, peppers, firs, cypress and all the trees that ornament landscapes in any part of the world, are growing on the hillsides, and from this mass of greenery the white walls of the castellated buildings rise with majestic grandeur. Red tiled roofs and golden tipped towers flash in the sunlight, completing the picture.


The Coming Exposition at San Diego—Main Entrance to the Home Economy Building

Almost in the center of the wonderful city is planted a grove of oranges and lemons and pomegranates, and all the other trees that bear the fruits of California. There are spacious lawns of velvety grass, and fountains playing everywhere. For statuary there have been reproduced in concrete, life-sized replicas of the great carved stone monuments of the ancient Mayas, brought from Quirigua.

Organization of the working staff of the Exposition was perfected early in 1910, with D. C. Collier as president, H. O. Davis, director-general; Frank P. Allen, Jr., director of works; E. L. Hewett, director of archæology and ethnology; Winfield Hogaboom, director of exploitation and publicity, and H. J. Penfold, who is the secretary.

Decision was reached in the early stages of the work that the San Diego Exposition should use as the foundation of its general scheme, the progress of man through the ages from primitive times to the Exposition year. This plan is to be carried out to the fullest extent possible. Also it was decided to make the Exposition educational in every one of its salient features, and to exploit the opportunities of the Pacific Coast of the United States, and the possibilities of establishing more complete commercial relations with other countries of the world.



The Coming Exposition at San Diego—Science and Education Building

The entire Exposition has been planned with these ends in view. By the close of 1913 participation of states of the United States and foreign countries had been secured sufficient to warrant the announcement by the Exposition officials that at least ten millions of dollars will be expended on the Exposition.

Work on the Exposition grounds was begun in 1911, continued through 1912, and in the early months of 1913 the construction of the exhibit buildings was completed. The adornment of the grounds adjoining the buildings with plantations and all varieties of tropic and semi-tropic foliage, will be carried on to the time of opening the gates, January 1, 1915.

Facade Showing the Main Entrance to the Arts and Crafts Building

The plan which the department of exhibits has evolved for the San Diego Exposition, and which is now being carried out, is unique, and in the estimation of many exhibitors to whom it has been presented will be the most effective of any yet devised for any exposition. A comprehensive display of the results of all human activities has been attempted, and emphasis is being laid on all of those things which have had and will have to do with the wonderful development of the western portion of America.

Space in the main exhibit buildings is being granted to producers of all articles calculated to interest the people of the West, and in each instance the management desires the exhibit to be in action. Little space is being given to dead or motionless exhibits. Processes of manufacture and demonstrations of the utility of articles are desired rather than displays of products in bottles or cans.

Many exhibitors are taking ground space and erecting individual buildings, and preparing adjoining grounds for exhibits that can be demonstrated out-of-doors. As much as six acres of ground have been allotted to one exhibit. Several have taken from one to five acres on which to make out-door demonstrations.

Sales privileges, within the dignity of an exposition of this character, are being granted.

◆

The first actual theatre in Ceylon is to be constructed at Colombo at a cost of $40,000. The building will be of brick, iron and reinforced concrete and have a seating capacity of 1000. For many years Colombo's only amusement houses have been the public hall and the tents of the itinerary shows.

◆

Work is about being commenced at Essington, Pa., on more than 100 two-story brick houses.

Design of Beams, Girders and Trusses

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C. E.

THE object of the present series of articles is to give to practical men who have had no mathematical training beyond common school arithmetic, some necessary instruction in computing the strength of beams, girders, trusses, columns and foundations. Numerous articles of a similar import have been written, but in the majority the reader has been required to memorize rules and constants, without a proper training in the principles. The writer intends to treat the subject in a thoroughly modern way and discard all purely empirical rules, when rules with a scientific basis can be readily explained.

First it is necessary to settle upon a definite terminology—that is, settle upon a system of shorthand symbols to use—for it is best to write rules by means of formulas. Formulas are merely mathematical shorthand, and when a formula is seen it is not algebra. Algebra is useful in deriving a formula, but when the formula is presented it requires only the use of common arithmetic to solve it.

Let W = a uniformly distributed load.

Let w = a unit of a distributed load. On a panel w is the load per square foot. On a beam or girder w is the load per lineal foot. Then it follows that $W = w$ multiplied by the span.

P = a concentrated load. When several concentrated loads are used the different loads are designated by subscripts, as $P_{,}$ — $P_{,,}$ — $P_{,\,,,}$ — $P_{,,\,,,}$ etc.

S = clear span between supports.

L = length of span used for obtaining a bending moment. That is a beam may extend from one support to another with a span, S, measured from face to face of support, and this will be used in obtaining W, the total load on the span. To find the bending effect of the load it is necessary to use a length measured from center to center of supports, or from points back of the face of the supports and this length is L, which is always greater than S.

l = any portion of L or S used to obtain a distance from the support to the center of gravity of a load. When distances are required to several loads subscripts corresponding to those under the respective loads are used. Thus to load $P_{,}$ we use $l_{,}$; to load $P_{,,}$ we use $l_{,,}$ etc.

The use of the letters is illustrated in Fig. 1, in which a cantilever beam is shown; and in Fig. 2, in which is shown a beam on two supports. To illustrate a uniformly distributed load the weight of the beam is used.

Sometimes the letters a, b, c, etc., are used to designate portions of a span or lengths less than the whole, but these will be dealt with as they may arise. The letters x, y, z, etc., are used similarly and will be dealt with when required.

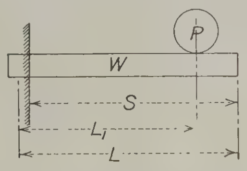


Fig. 1—The Cantilever Beam

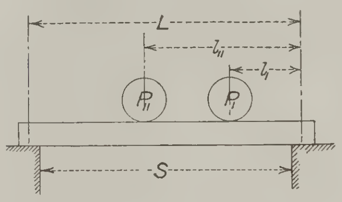


Fig. 2—Beam Resting on Two Supports

Design of Beams, Girders and Trusses

Moments

A cantilever beam is supported at one end and may be loaded at any point with a concentrated load. The load tends to bend the beam down. The uniformly distributed weight of the beam tends to bend the beam also, so on all loaded beams there must be considered the actual weight of the beam plus added loads it may carry. The name cantilever gives a hint that the bending action is similar to that of a lever.

All formulas and rules for obtaining the effect of loads on beams are derived from the fundamental principle of the lever. It makes no difference whether the beam rests on one, two or more supports, the principle of the lever, as represented by the cantilever beam in Fig. 1, gives the key for obtaining the desired information.

All formulas and rules for obtaining the strength of a beam to resist the bending effect are similarly based on the principle of the lever.

The bending effect is termed a Bending Moment and the resisting effect, dependent upon the form,

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Note—In this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

size and material of the beam, is termed the "Resisting Moment." The bending moment is first found and then a beam having an equal resisting moment is used to carry the load.

Tables are published of resisting moments of standard size beams from which a designer may readily obtain a beam to resist a bending moment, which is calculated for each case, as spans and also loads to be carried on the spans vary considerably, every building presenting a number of different combinations.

When the resisting moment is greater than the bending moment there is obtained a factor of safety.

Let M = moment. This may be either bending or resisting moment.

M_b = bending moment. The subscript is used only when both moments are used in the same expression, and there must be some distinguishing mark.

M_r = resisting moment, the subscript being used only when the subscript b is used for the bending moment.

$$\text{The factor of safety} = \frac{M_r}{M_b}$$

A Moment is the product of a force multiplied by the distance through which it acts.

In Fig. 1, the load, P, acts through a distance, $L,$. The formula is

$$M = P L,$$

Forces act through the center of gravity of bodies, and a load is a force, for it tends to bend the beam down. The length $L,$ is measured from the center of the support to the center of gravity of the load.

For a uniformly distributed load the center of gravity is at the center, which for the beam will be one-half of L, so the formula for the bending moment due to the uniformly distributed load is

$$M = W \times \frac{L}{2} = \frac{WL}{2}$$

The total moment on the beam is

$$M \text{ or } M_b = PL, + \frac{WL}{2}$$

In Fig. 6 a cantilever beam carries two concentrated loads. For this condition

$$M = PL, + PL,, + \frac{\text{WL}}{2}$$

For more than two loads the formula will be the same, it being only necessary to obtain the moment for each load and for the weight of the beam and add them together.

When the load is in pounds and the distance to the center of gravity is in feet the bending moment is in foot pounds. When the distance is in inches the bending moment is in inch pounds. A bending moment in foot pounds is converted into inch pounds by multiplying by 12. A bending moment in inch pounds is converted into foot pounds by dividing by 12.

The following examples will illustrate the foregoing formulas:

1. A cantilever beam projecting 10 ft. beyond a wall and weighing 50 lbs. per lineal foot, carries a concentrated load of 400 lbs. at a point 7 ft. from the wall. Find the bending moment in foot pounds.

The total load is 500 lbs. (weight of beam) + 400 lbs. = 900 lbs. Assume the beam to be fastened in the wall 1 ft. and the center of bearing is then 6 in. from the face of the wall. The length used for the beam will be 10 ft. 6 in. (10.5 ft.) and the distance to the concentrated load will be 7 ft. 6 in. (7.5 ft.).

$M_b = (400 \times 7.5) + (500 \times 10.5) = 8250$ ft. lbs.

2. Add a load of 200 lbs. 4 ft. from the wall and a load of 300 lbs. 8 ft. from the wall.

$M_b = (400 \times 7.5) + (500 \times 10.5) + (200 \times 4.5) + (300 \times 8.5) = 11{,}700$ ft. lbs.

No more examples are required, for the principles have been sufficiently illustrated.

The reader will notice that the distance to the center of gravity has in all cases been measured back from the face of the support, but the length used in computing the weight of the beam was the clear length. In this way all the weights are those clear of the supports, for the portion of the beam resting on the support has no effect on the bending moment.

It is wrong to use only the distance from the face of the support for cantilever beams, or the clear span between supports for supported beams, when figuring a bending moment, as it throws all the bearing on the edge. By using the longer distance in computing bending moments a stiffer beam is secured. Commercial designers in competitive work invariably use the distance measured from the face of supports, as they thereby save a little material and are enabled to cut down cost. All designs should be prepared by men who have no other interest than that of securing for the owner a design which is not "skinned."

(*To be continued.*)

The "Open Shop" Building Trades Exchange

An organization of contracting firms engaged in various branches of the building industry has just been formed in the city of Hartford, Conn., under the title of the Open Shop Building Trades Exchange. The novel feature of the organization is that all of its members conduct their business on the "open shop" basis. The officers are:

President	Robert Porteus
First Vice-President	J. L. White, Jr.
Second Vice-President	William A. Clinton
Treasurer	Frank D. Ellison
Secretary	Edward S. Francis

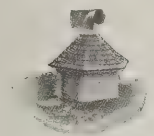
There is a charter membership of 30 contractors, but all individuals, firms or corporations associated with the building industry in Hartford or vicinity, the business of which is conducted on the "open shop" basis, are eligible to become members. President Porteus states that the Exchange may employ both union and non-union mechanics, each employer dealing directly with his own men.

More than two billion board feet of timber with a value of $4,500,000 on the stump was sold by the Forest Service last year according to the recent annual report of Henry S. Graves, forester.

Sewage Disposal for the Country Home

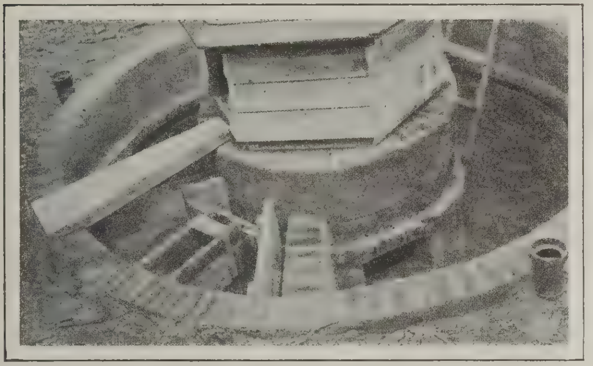
How to Build of Brick and Vitrified Sewer Pipe a Simple and Most Efficient Plant

By Benjamin Brooks

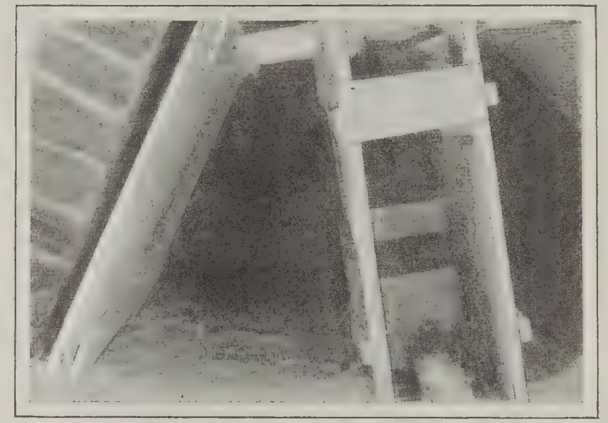


IN SOME respects the cities are healthier than the country. I read Thoreau and other nature literature, and like it; but all the same it is upon going *to* the country for a vacation, not upon returning to the city, that I submit to having myself punctured by Dr. Watson's needle full of typhoid preventive.

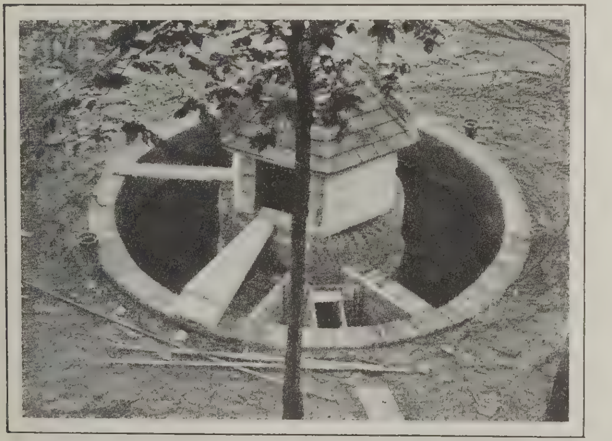
The reason the cities are ahead of the farmers on sanitation is because they have had to be. Problems of sewage disposal overcome by cities generations ago, are now confronting the farmer for the first time. Sewage disposal on the farm was formerly carried on largely through the back kitchen window.



A Baffle Board in Front of the Settling Tank Prevents Disturbances and Permits Heavy Matter to Sink Quietly to the Bottom of the Tank



Looking Down on the Baffle Boards in the Septic Tank



Showing Inner and Outer Walls with Corbels Ready to Receive the Filter Slaks

The Roof Slabs in Place Ready for the Covering of Earth

Sewage Disposal for the Country Home

Five years ago a Chicago firm was greatly astonished to receive an order from a remote but prosperous farmer for a first class porcelain bathtub and "fittings." The firm wrote back, asking him if he didn't mean an enameled tub, advising him of the high cost of the porcelain article. The farmer answered immediately to the effect that he knew what the proper stuff for a bathtub was, that he had the money to pay for it; also, that he was as good as any city dweller and was going to have what he wanted.

A great many farmers have since come to the same conclusion. Their wives have read the hot-and-cold water advertisements in various magazines and their daughters have just returned from college.

The inevitable result is a gasoline-driven pump at the well instead of a bucket on a rope, a complete piping system upstairs and down instead of a barrel on the back porch, and a fully equipped bathroom that uses up more than a hundred gallons of water per day for each member of the household.

But now comes the farmer's real problem—how to get rid of the hundred gallons per. In summer the old sump hole down in the corner of the lot is overflowing into the vegetable garden and the duck pond. The flies are "just awful," the atmosphere is also "just awful." Typhoid threatens. The farmer must have a sewage disposal plant.

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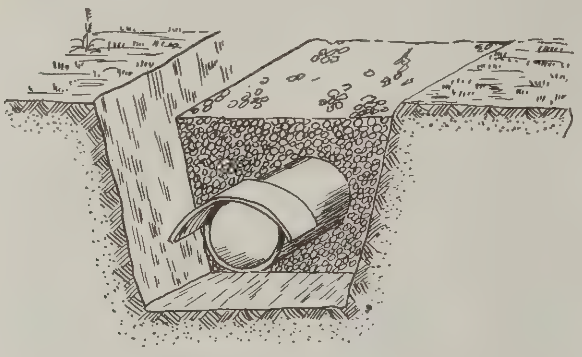
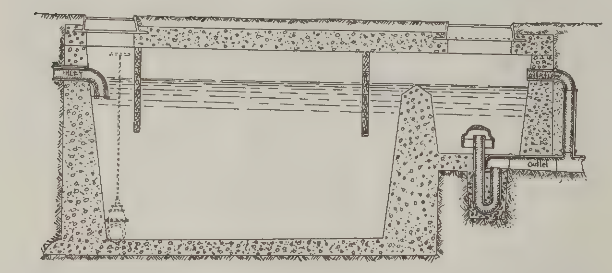
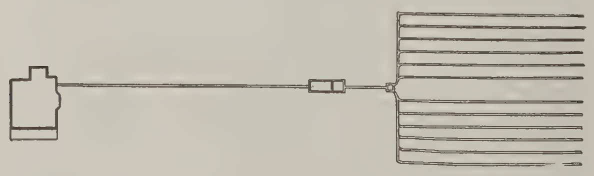
Sewage always contains a multitude of bacteria. Certain kinds of these decompose garbage into its original elements. But these little workers to operate to advantage must have certain conditions. These conditions are to be found in sewage disposal plants, which are constructed in such a way as to meet this need. Among the farmers they are becoming more common. A sewage disposal plant, then, is nothing but a "bug farm;" but it must be remembered that the "bugs" are exceedingly fussy. Some must live in water without air, others must live in air with just a little water. They prefer quiet neighborhoods and resent disturbances. You see now why the old-fashioned sump is not a suitable bacteria farm.



Method of Surrounding the Vitrified Sewer Pipe with Broken Stones



A Cross Section of a Small Settling Tank with Intermittent Discharge Siphon Shown at the Right in the Picture



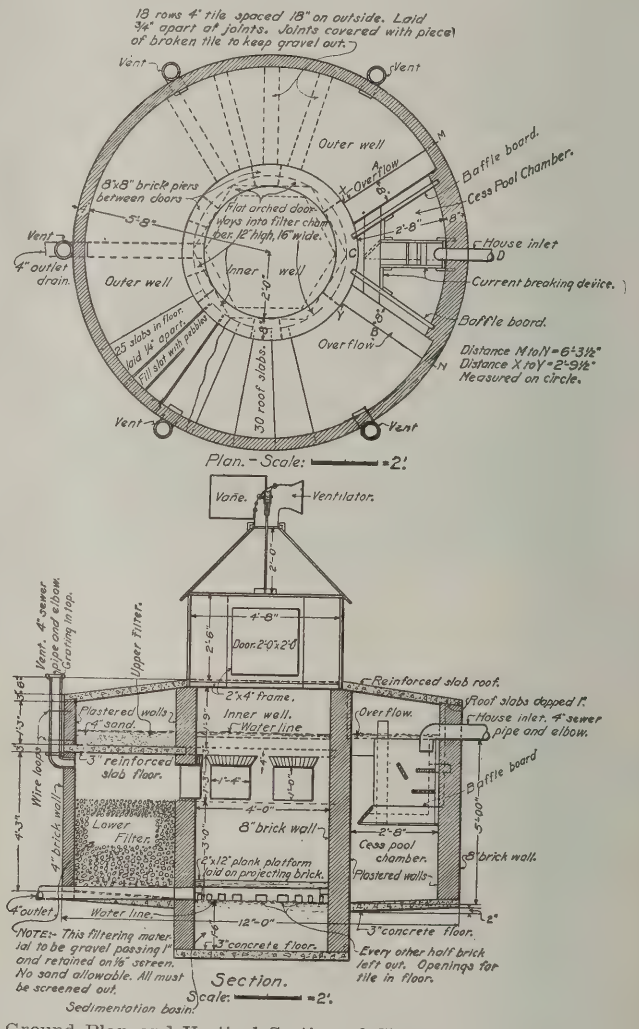
Ground Plan Showing Relative Position of House with Settling Tank of Brick and Distributing Tiling

Sewage Disposal for the Country Home

The first stage of a farm sewage disposal plant is a settling tank sunk in the earth. For a family of four, it should be about five feet deep, four feet long, and three feet wide. The inlet pipe from the house should enter it at a grade of about three inches to a hundred feet and turn down under water to prevent splashing. A baffle board in front of it will also prevent disturbance in the tank; and the industrious bacteria, although experiencing much inconvenience due to changes of environment and sudden inrushes, will manage to dissolve and disintegrate a part of the putrescible matter. Meanwhile the stray dish rags, hair pins, or other obstructions will tend to sink quietly to the bottom.

The sewage then passes under another baffle, over the end wall at the far end of the settling tank, and so into a discharge chamber with a siphon at the bottom. The sewage having risen to the proper level, the siphon—just a plain flush tank siphon always to be had in the market—automatically empties the discharge chamber.

From this point the sewage is ready to be treated by the bacteria which prefer a rugged existence in the open air rather than the calm humdrum life led by the tank dwellers.



Ground Plan and Vertical Section of Circular Tank 16 Ft. in Diameter Recommended by the Iowa State College Engineering Experiment Station

The ideal home for aerobic bacteria or "fresh air bugs" is a pile of loose stones flooded from time to time with rich and delectable sewage. We have, therefore, but to lay a line of three-inch vitrified clay sewer pipe in an open trench leading away from the settling tank and then fill the trench around it with broken stone about the size of a pigeon's egg.

In order to allow for possible repairs, lay two lines of vitrified clay sewer pipe in two rock trenches each about one hundred feet long. The pipe is not porous, of course, for then the winter frosts would burst it, and plenty of room must be left at the joints for sewage to leak out into the rock trench.

All the materials for a sewage disposal plant, in fact, must be of the best on account of the strong chemical nature of sewage. Tanks should be built of excellent brick set in rich cement so "slushy" that the joints cannot be entered by the point of a trowel. The brick themselves are acid proof. Where concrete has to be used, it must be of the best, with a carefully troweled surface, for such concrete as is ordinarily used for water culverts or sidewalks is soon destroyed by sewer gas. Metals should be ued sparingly for they are all sure to corrode rapidly.

Having thus been provided with model housekeeping apartments, the aerobic family are quick to move in. During the flooding of their dwellings they may be figuratively said to stock their pantries and to eat greedily.

Modifications of the Layout

Now, of course, there are many modifications of this simple lay-out. The tank, for instance, can have a sort of double bottom with a slot in the upper one to let down the settling solids, and a sluice gate in the lower one to sluice out the sediment every few months.

If the ground slopes sufficiently and the amount of sewage permits, liquid can be sprayed continuously over the rock trenches instead of flooding them intermittently—in which case there is no need of the flush-tank siphon in the settling tank.

Again, if the soil is very porous and sandy, we do not need broken stone, but may simply bury the clay pipe in the soil. The finer the gravel, the purer the water coming from the disposal plant, but the more liable is the kitchen grease to clog up the whole system.

Since no settling tank is perfect and no siphon is absolutely proof against clogging, and no stone trench entirely proof against freezing, the Iowa State College Engineering Experiment Station has evolved a very compact and efficient disposal plant all in a nutshell, with neither siphons, valves nor exposed beds. It gives great promise of success.

Description of the Plant

This plant, shown in the illustrations, consists of a circular tank sixteen feet in diameter, sunk in the ground, with another smaller circular tank inside it. The large outside tank is a shallow two-story affair, while the inside one is a deep well. Sewage flows into a settling pocket on one side, and having overflowed this, streams out over the second story, making a shallow lake for the pleasure of the anaerobic or sea-going bugs. It then strains through a bed of coarse sand, drips through holes in the floor, and rains down on the fresh air cranks that live in the broken stone down stairs. Having been shorn of all its objectionable features by these voracious ones, it trickles down to the bottom of the central well and then flows harmlessly away. Ventilators, meanwhile, cause fresh air to stream through the tank.

From all this it appears that a sewage disposal plant on the farm is a matter of careful planning and attention to certain necessary details but simple in construction, cheap in cost and can be built by any farmer who wants to do it.

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While there are five hemlocks in the United States, only two are of any commercial importance, common hemlock and Western hemlock. Of these two Western hemlock makes the better lumber.

Meeting of Washington Builders Exchange

The fourth annual meeting and election of officers of the Builders and Manufacturers Exchange of Washington, D. C., was held on June 1 at their headquarters in the Builders Exchange Building, 1220 New York Avenue, N.W. The reports of retiring president Charles A. Langley and of secretary Charles E. Welsh reviewed at length the work of the organization during the past year. The report showed that the 12 months under review had witnessed unusual activity and progress and showed that the membership of the organization had been increased by 67 during the past 14 months with a prospect of increase to 225 members within a comparatively short time.

The membership committee carried on an active campaign during the entire period mentioned and the present membership is greater than at any previous time in the history of the Exchange. The committee is headed by George Plitt, Charles E. Coberth and R. B. Cummings, associated with whom are 25 other members of the organization.

The balloting for officers for the ensuing year resulted in the following unanimous choice:

President	E. R. S. Embrey
First Vice-Pres	James L. Parsons
Second Vice-Pres	George Plitt
Third Vice-Pres	George E. Wyne
Treasurer	James L. Marshall
Secretary	Charles E. Welsh

The board of directors for the ensuing year is made up of the following members: S. J. Prescott, C. A. Langley, E. C. Graham, W. T. Galliher, Fred J. White, C. E. Coberth, Harry D. Watts, Andrew Murray, George E. Walker and P. R. Pullman.

In view of the extraordinary growth in the membership a special committee was appointed to consider the advisability of purchasing or building a larger home for the Exchange. The membership committee is compiling a classified list of the members together with other interesting matter concerning the organization. This is to be attractively bound in leather and is designed for circulation among the members and others interested in the welfare of the organization.

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Comparative Cost of Frame and Stucco Construction

In order to determine the difference in cost between the usual frame house construction using sheathing and weather boards and the type of stucco building in which the stucco is applied to metal lath fastened directly to the studding, a well-known concern in the west takes the trouble to secure a number of estimates from different sections of the country. The average of these show that the stucco construction is only a fraction of 1 per cent. in excess of the frame construction. Using metal lath as outlined for the stucco base and also for the interior plastering there was shown an increased cost of from 2 to 3 per cent. In view of the less cost of upkeep and the fire resisting quality of the stucco construction the small additional cost is regarded as being fully justified.

Indirect Lighting System for the House

A Method of Illumination Which Is Rapidly Growing in Favor—Some of Its Many Advantages

By Warfield Webb

EVERY year we are advancing toward higher ideals in the construction of our homes. We are beginning to see wherein there have existed faults, wherein lay the gross errors that have counteracted our best efforts to minimize. We are learning simply from experience, and this has done much for us toward a higher realization of the ideals that should make the home all that the term implies.

As our cities have grown into the dwelling places of so many thousands, and the congestion thereby increasing, the exclusion of the natural light from many dwellings has been the obvious outcome of this crowding. As an alternative, we have been forced to seek some means of artificial lighting, and this has brought with it many objections, to say nothing of danger, more or less serious, to our eyesight. The inconveniences have been overlooked in a measure, and many of us have contented ourselves with condtiions that have been at least unfavorable from a hygienic standpoint.

There have been various systems tried out, and while some of these have proven more or less successful they have been simply factors that have in a number of cases worked injury to the sight and annoyance to the occupants of the rooms. The direct rays of light in the home or public building have been the immediate cause of much of this damage. The strain demanded of the sight by this artificial light has caused us to use our eyes in excess of their natural force. It has been proven that the ultra-violet rays are such as to work injury to the sight when long exposed to the glare so diffused.

Indirect Lighting System for the House—A Hotel Dining Room Lighted by Means of Suspended and Side Wall Fixtures

Many of us have been unconscious of this, and we have worked along with a feeling of contentment that has been the direct cause of much eye weakness. The architects, contractors and builders have been unable to do much to eliminate this feature. The engineers have only within very recent times been able to grasp this problem and to offer some practical suggestions that have been adopted with most pleasing results. These have been brought about by several agencies. In the first place there has been a more careful study made of the various kinds of artificial light. This has made possible newer ideas, and has also solved the momentous question of regulation, dissemination of rays, placing of light units, number required for any given space and kindred important points.

Indirect Lighting System for the Home—A Staircase, Hall and Reception Room Lighted by Indirect Illumination

It has been found that some kinds of light are more suited to certain places than to others. The apartment where there is least demand for illumination can be supplied with fixtures that will not diffuse any great amount of light. This also applies to the decoration of the room, and the wall covering will not be such as to heighten the lighting effects of any apartment of this character.

However, one of the most satisfactory methods of light diffusion has been found in the inverted light. This is better known as the indirect lighting system, and is used where the home is supplied with either gas or electric fixtures. That which most nearly makes possible a soft light, akin to the natural or sunlight, has proven to be the most helpful to the sight, as well as the most satisfactory in which to live, under any condition. Where the rays are direct, one lives in an atmosphere of artificiality. The sight is subjected to a continual strain that sooner or later makes itself felt, though sometimes working so slowly, is perceptible to but very few.

We have done much to improve the sanitary condition of the home. There has been a regulation of the bath room, the toilet, and the culinary department. The matter of ventilation has been considered. The materials have been made more nearly fireproof, and still many of us are content to use the lighting systems that have been in vogue for years. There has been a decrease in the amount and character of natural light in many places, and the question of making has only recently been deemed of sufficient value to excite the public interest.

If it has been proven, as is the case, that many of the accidents in manufacturing plants can be traced directly to artificial lighting, the glare of the rays on the machine, blinding the worker, etc., is it not also true that much of the eye weakness is due to the poor or inferior lighting in the home? This is no longer denied, and steps are now being taken to remove this cause.

The only serious drawback thus far to the indirect lighting in the home is the cost of the fixtures. In most cases these have been made only in elaborate styles, and the cost has been somewhat prohibitive on that account. This is due in a measure to the fact that thus far it has been looked upon as a "fad" by some, and the real virtue and necessity of the change have not been deemed of sufficient importance to make the demand general. The styles of fixtures that are now in use are many. They comprise those of plastic ornamentation, bronze, brass, glass and lesser costly styles. However, as a rule, they are elaborate, and on this account are not within the reach of the builder of the home of modest cost.

The several advantages that are to be derived from this system of home light diffusion are apparent to any one who has given the subject the least investigation. There is a softness, a restful and soothing light that at once infuses itself into the mind of the occupant. There is no cause to strain one's eyes in order to detect another, or to see with ease in any portion of the apartment. In fact, there is the same effect noted as though one were sitting in the natural light of day.

A Room, Making Use of Both Side Wall and Ceiling Fixtures

The styles of globes are many, these sometimes being dense enough to exclude all the light from the lower section of the fixture, and directing the rays upward and outward. In other instances there are opaque and frosted globes, as well as those of colored and art glass, with many delicately-tinted effects. The idea in every instance is to soften the light and to exclude the direct rays that have been proven so detrimental to the eyesight.

These fixtures can and will be made in less costly styles just as soon as there is a keener need for their adoption. The subject of proper lighting for homes should be taken up and acted upon with a more general desire to counteract the dangers that have so long been a serious menace to the eyesight in many homes. It is a simple matter to construct a chandelier that will be within the reach of the average home builder. The desirability of the change is of such importance that it belongs in a class with other advances that are being made to render the home a more desirable dwelling place.

To counteract the evils of congestion, attendant upon the growth of our cities, we are forced to seek such means as will prove of real value in this respect. The question of proper lighting is one of these topics demanding our attention. The builder can be of assistance in this way. He can make a study of this topic and see the advantages that are to be gained from a careful arrangement of the fixtures, and of the desirability of the indirect lighting system. By advocating this and by assisting in bringing it about there will be much done to remove one serious source of eye-damage to-day.

In the pictures here presented there are shown various applications of the indirect system of lighting, one example being the dining-room of a modern hotel, wherein both suspended and side wall fixtures are used. The smaller views represent room and stair hall lighting by means of suspended fixtures. The photographs from which these engravings were made were kindly loaned by the Decorators' Supply Co. of Chicago, Ill.

Staging and Its Relation to Injuries

In referring to the frequent injuries to workmen, caused by the breaking of stagings on which they are at work, the claim is made in a paper read before the Boston Society of Civil Engineers by Leonard C. Wason, that this is due to leaving the building of these stagings to the workmen.

"Although there may be a large quantity of excellent material handy, it is not uncommon for workmen to pick out inferior stock for building a stage.

"To avoid these difficulties, the principle has been adopted by the Aberthaw Company of designing all stagings in the office for any important work, as for the outside of a building. The stage is laid out, giving dimensions and spacing of lumber, the sizes, number and location of nails, whether the stage be built from the ground up, whether it be a cantilever from an upper story window, or a swing stage hung by ropes from the roof. The plan states the maximum safe load which the stage is permitted to carry.

"Material is selected for the workmen, and before any are allowed to use it, its construction is inspected either by the superintendent or by his authorized representative. In this way as much safety is insured the men as the nature of the undertakings will permit. As the men work with assurance of safety, an ultimate economy results."

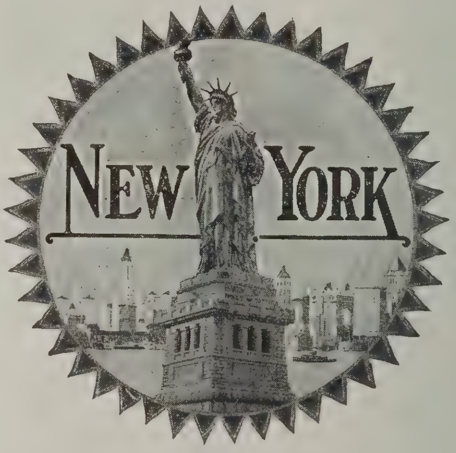
Emblem of the Merchants' Association of New York City

A distinctive emblem typical of its vast industrial and commercial activities has been evolved for New York City by the Merchants' Association after a prize competition in which a large number of drawings were submitted. It is a circular design, as indicated in the picture, showing a three-quarter view of the Statue of Liberty upon its pedestal, thrown into relief against a background displaying the harbor and shipping and a typical portion of the skyline of lower Manhattan, with the name "New York" above.

The terms of the competition provided for a prize of $150 for the most meritorious design, and a second prize of $50 for the design which was judged to be next in merit.

The first prize was won by David B. Hills, of Brooklyn, a student in the Art Students' League of New York, and employed in the Sales Promotion Department of *The Building Age*. He has also won prizes in several other competitions.

The second prize was awarded to Raphael Beck, of Buffalo, an artist who holds prizes awarded to him at the Louisiana Purchase Exposition at St. Louis, the Pan-American Exposition at Buffalo, and the Lewis and Clark Exposition at Portland, Oregon.



COPYRIGHT, 1914
THE MERCHANTS' ASSOCIATION OF NEW YORK

Emblem Designed by D. B. Hills of the Sales Promotion Department of "The Building Age"

When the contest closed two hundred and forty-eight designs had been submitted from all over the country and in making the award it was necessary to take into consideration the adaptability of each design for reproduction as a stencil, as well as for printing in black and white or in colors. This eliminated many meritorious designs which were too elaborate for reproduction to stencil form.

From the two prize designs the Emblem was evolved. Modifications and changes were needed to render it suitable for reproduction in the various forms required, and these were made by an artist engaged for the purpose.

It is the intention of The Association that merchants and manufacturers who ship goods from New York to all parts of the country shall attach to each package shipped a reproduction of the design in the form of a paster, stencil, tag, or in any other form that the shipper may prefer. In this manner the merchandise which goes out will advertise New York's supremacy as a commercial center.

A BUILDING OPERATION AT OAK PARK, YOUNGSTOWN, OHIO, SHOWING HOUSING ACCOMMODATIONS FOR 87 FAMILIES

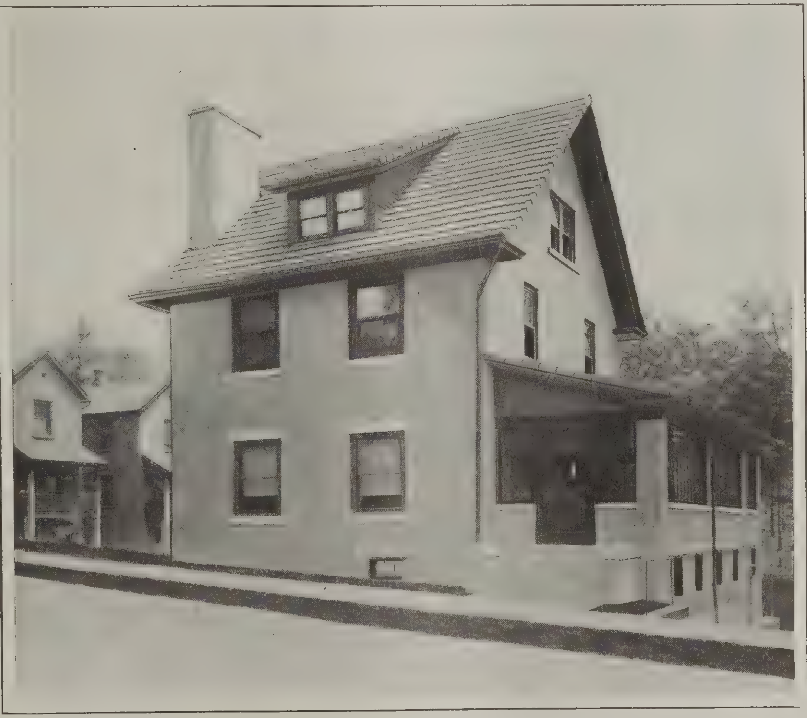
A Moderate Cost House of Hollow Tile

A Two-Story and Attic Dwelling Built of Concrete Hollow Tile at a Cost of $4500

THE picture which we present at the top of this page represents a building operation in a suburb of a city of the Central West which affords housing accommodations for eighty-seven families. At the extreme left hand a glimpse may be had of a portion of the house shown in the center of this page and the plans which are given upon the page that follows. This two-story and attic dwelling, as well as those in the upper picture, is built of Pauly's concrete hollow tile with two coats of stucco on the exterior walls and is plastered on the inside direct to the tile.

The roof is of red cement tile. Some of the down spouts are of copper and some of Toncan metal. The flashings are sheet lead.

The veranda floor is of concrete with a depression around the edge to convey the water to cast-iron pipes which are connected to the sewer.



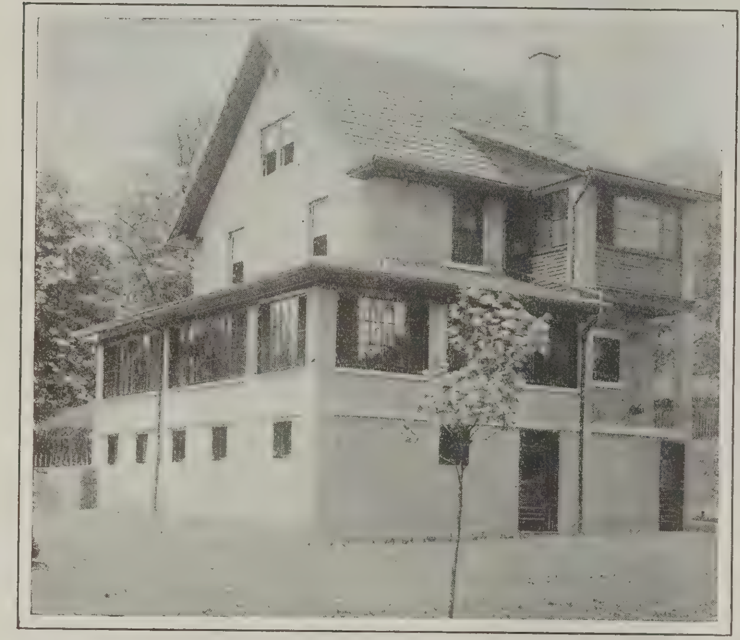
A Moderate Cost House of Hollow Concrete Tile—This One Is Seen at the Extreme Left in the Picture Above

A feature of the basement arrangement is the position of the coal cellar which is a room 7 x 8 ft. in size under the sidewalk. In the basement which is 8 ft. in the clear are furnace room, laundry with tubs, drying room, tool house, toilet and a room for vegetables and fruit. All the partitions in the basement are of tile.

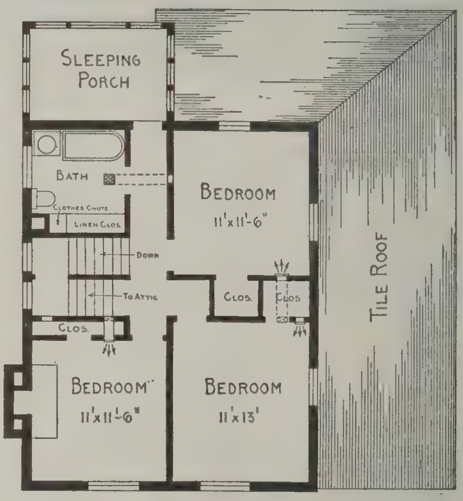
The drying room with which the clothes chute communicates is supplied with a warm air pipe and an outlet paralleling the chimney to the cap, which is intended for the removal of the moisture. The large chimney is constructed of concrete tile with clay tile flue linings. There are three flues, each 8 x 12 in. in cross section which afford the necessary draft.

On the main floor are living room, dining room and kitchen, while on the second floor are three sleeping rooms, bath room and sleeping porch. The attic is partitioned in such a way as to provide two additional sleeping rooms. This part of the house is supplied with hot and cold water, gas and electricity.

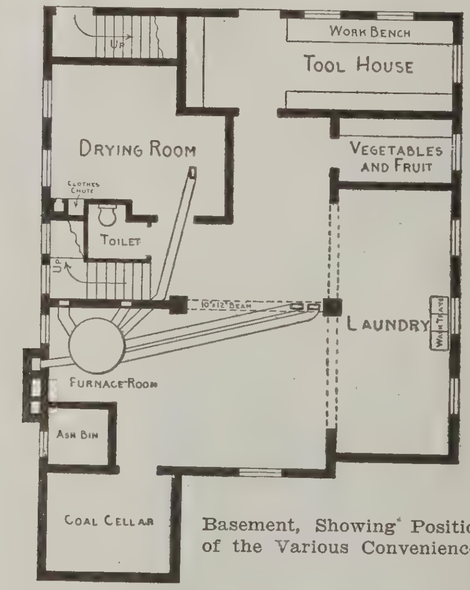
An examination of the picture representing a rear view of the house shows the enclosed sleeping porch, the floor of which, or at least that portion of it which extends over the kitchen, is of concrete. This in turn is covered with Rubberoid and a wood floor laid thereon.



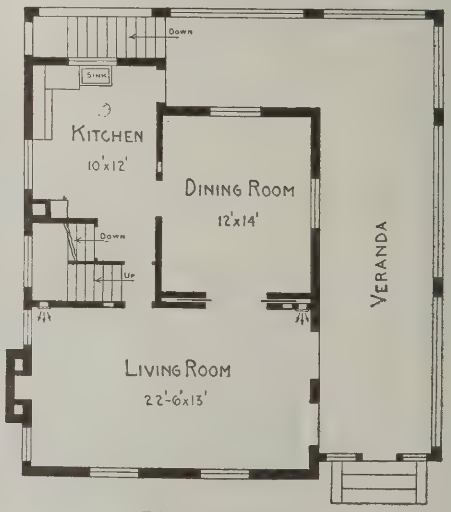
Rear View of the Hollow Concrete Tile House Showing Sleeping Porch



Second Floor



Basement, Showing Position of the Various Conveniences



First Floor

A Moderate Cost House of Hollow Concrete Tile—Scale of Floor Plans 1/16 in. to the Foot

All first floor rooms are 9 ft. 1 in. in the clear and those on the second floor are 8 ft. 6 in. in the clear.

The mantle in the living room and that in the bedroom immediately above is constructed of concrete covered with a blend of white Atlas cement, silica sand and marble dust.

The floors are double, B. & B. flooring being used for the finish floor. The wood trim is of No. 1 yellow pine sanded and rubbed and then given three coats of varnish.

One of the very important features of this house is the ventilating system which has been introduced whereby each and every room as well as the clothes closets are ventilated. This is accomplished by placing white enameled register faces 8 x 16 in. in size in the walls between studs. In the gables are 8 x 16 in. cast iron ventilating grates through which a current of air is constantly passing. The impure air from below is drawn up and being met by the upper current is carried out through the gable grates.

Warm air is supplied to the veranda by a 15-in. pipe connected with a 16 x 20-in. register, so that in case it is desired the temperature can be brought up to a moderate point.

The clothes chute leads from the drying room to the bath room and has an opening at the kitchen level.

The bath room and kitchen walls are covered with Sanitas oil cloth to which two coats of transparent varnish were applied. The other rooms are treated with high-class wall paper.

In the operation here referred to the houses are grouped in a park consisting of seven acres of land and the cost of the houses range from $1350 up to $4500. The houses were designed and built by the Modern Homes Company, Youngstown, Ohio, in a suburb known as Oak Park, and the dwelling here illustrated and described is occupied by the agent of the company.

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Portals of Panama Exposition Buildings

One of the most magnificent architectural features of the Panama-Pacific International Exposition is formed by the two half domes over the western entrances to the Palace of Food Products and the Palace of Education, respectively. One of them, otherwise known as the Portal of Thought, in keeping with the subject of the display that the building will contain, has just been completed. The second, to be known as the Portal of Plenty, will fulfill the same purpose in the Palace of Food Products.

The construction and rich coloring of the Portal of Thought, both of which contribute to its appearance of massiveness, invariably arrest the attention and arouse the admiration of visitors, to whom the portal is easily one of the most interesting decorative elements of the Exposition.

The portal is similar in design and appearance to the half domes which were a characteristic of many of the great Roman baths, particularly during the reign of Diocletian. The base of the dome is in the form of a hemicycle having a colonnade of eight columns in imitation Sienna marble. Each of the columns is to be surmounted by a figure symbolizing the Spirit of Education.

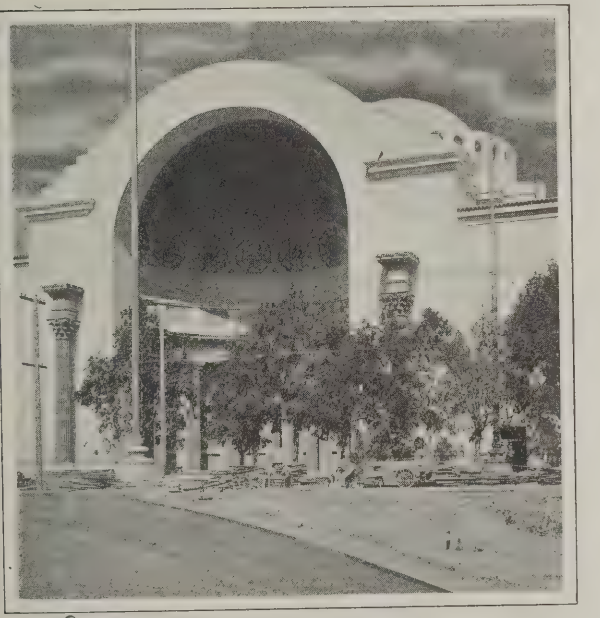
From the entablature above the columns rise the radial coffers. The coffers, which are to be plainly seen in the ceiling of the portal in the accompanying photograph, are octagonal in shape and are distributed in five rows gradually decreasing in size toward the top. The treatment of the coffers is after the manner of the Italian Renaissance and it is in them that the principal color effects of the half dome are obtained. The colors are variations of the fundamental tones that comprise the color scheme of the entire exposition, but owing to the light effects obtaining in the recess of the half dome they have a richness that give to the imitation marble an appearance of extraordinary reality.

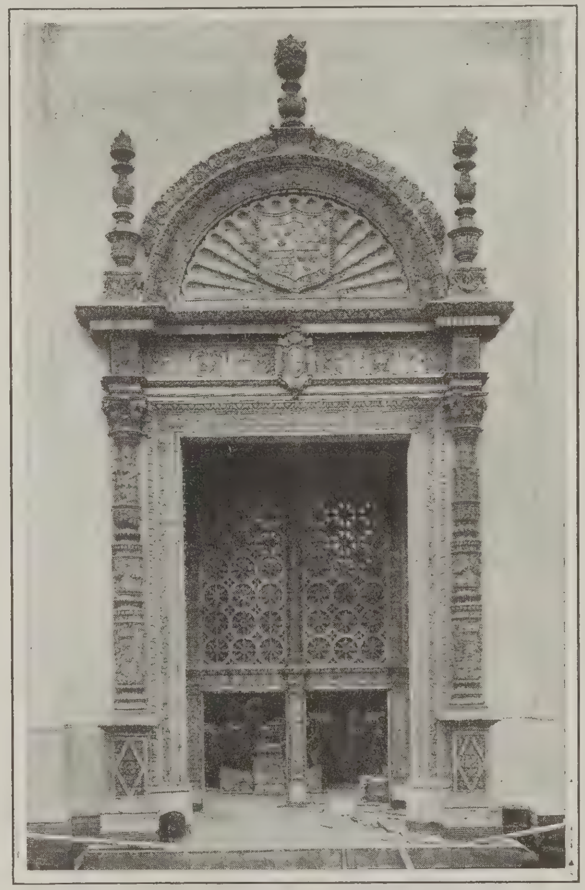
On the floor of the portal will be an ornamental fountain. On either side of the entrance will rise a massive isolated column which will support a figure representing "Philosophy."

The half dome proper rises to a hight of 112 feet and it is more than 40 feet across at the base. The inner columns are 36 feet in hight and the outer columns are 45 feet. The portal was designed by W. B. Faville, a San Francisco architect of note.

At the right of the picture may be seen a group of young eucalyptus trees awaiting transplanting against the palace walls, giving some hint of the rich horticultural embellishment this palace is to have. The conventional ornamentations of the half dome surface are enhanced by the application of contrasting pastel tints, applied under the direction of the artist, Jules Guerin.

In the second picture is shown an entrance just completed to the Palace of Varied Industries. The type is of the Renaissance period and represents a wealth of designs of attractive sculptural work. The shields bearing esoteric coats of arms stand between the colonnades on either side, while richly wrought standards rise above the arch. The strong colors that mark the architectural designs of the grounds nowhere appear to better advantage than in hightening the effect of these stately portals.


Entrance to the Palace of Education


Portal to the Palace of Varied Industries

Portals of Panama-Pacific International Exposition Buildings

Working Hours in Architects' Offices

Believing that uniform practice in various architects' offices is desirable for all concerned, the Chicago Architects' Business Association recommends that the following conditions prevail in architects' offices of the State of Illinois.

1. That employees be classed as regular and special.

2. Employees classified as "regular" will be those continually engaged for a period of not less than one year, on a weekly salary basis; it is expected that such employees will assume greater responsibilities to their employers and be granted special privileges, in consideration of faithful service.

3. Employees classified as "special" will be those engaged temporarily. It is deemed proper that such employees be paid by the hour for actual service rendered, making no allowance for vacation or holidays, it being considered fair under these circumstances to allow these draughtsmen a slightly higher rate per hour than regular employees who enjoy privileges of vacations and holidays.

Office Hours

1. It is understood that draughtsmen are expected to be in their respective offices ready to begin actual work at the hours stated, and that they will continue in service at least until hours fixed for cessation of work.

2. The regular opening time of offices shall be 8:30 a. m., throughout the year.

3. Period of service for Monday, Tuesday, Wednesday, Thursday and Friday, in the morning, shall be four hours, extending to 12:30 p. m.; that the lunch hour shall be one hour extending from 12:30 to 1:30 p. m.; that the afternoon period shall be four hours, extending from 1:30 to 5:30 p. m.

4. That the Saturday period of service shall consist of four and one-half hours, extending from 8:30 a. m., continuously to 1 p. m.

Units of Service

1. One week's service will consist of 44½ hours.

2. One year's service will consist of 2180½ hours.

Pay-Day

1. That pay-day shall be on Monday of every week.

2. That each pay-day draughtsmen be paid up to the Saturday night preceding.

Holidays and Vacations

1. We recommend that regular draughtsmen be given the following holidays on full pay: New Years, Decoration Day, July 4, Labor Day, Thanksgiving and Christmas.

2. That all regular draughtsmen having been in the employ of an architect for more than one year be given two weeks vacation on full pay, at time most convenient for employer.

3. It should be understood that "regular" draughtsmen quitting the employer's service of their own volition, preceding the completion of any year's service, shall not be entitled to a vacation.

4. "Regular" employees terminating service at the request of their employer shall be entitled to an allowance in cash proportionate to two weeks' salary allowed for vacation in the same ratio as period of service bears to one year.

5. Vacations and holidays are understood to be granted to employees for rest and recuperation, the employee being understood to be in the service of the employer during vacation and holiday time to the same extent as when regularly engaged in the office.

6. It is recognized that an average of 44½ hours per week's service is the maximum efficient service that can be continuously rendered without detriment to the health or efficiency of the employee, and that where the employee engages in outside architectural service of any sort for others, he does so at the expense of his employer, and his employer should be credited for corresponding loss of time. The practice of employees of one employer working nights or holidays for another is condemned as detrimental to the best interests of both employer and employee.

7. In case of emergencies of short duration, regular employees are expected to work over-time for the employer without extra remuneration other than a reasonable allowance for the expense of taking meals away from regular lodging place. In such cases, however, the employees will be credited with off time on account of sickness or otherwise, equivalent to the amount of overtime service rendered in cases of emergency.

8. Draughtsmen are encouraged, however, to make use of a portion of their time off for educational improvement.

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Gravel and Slag Roofs on Factory Buildings

The interest of the entire roofing trade of New York State is affected by the law which was passed in October, 1913, and which went into effect February 1, 1914. This law has a bearing upon gravel and slag roofs on factory building. It has been considered of sufficient importance for the National Association of Master Gravel and Slag Roofers of America to issue a circular in reference to it. Following is an extract from the law:

> No factory shall be conducted in any building hereafter erected more than one story in height unless such building shall conform to the following requirements:
>
> All buildings more than four stories in height shall be of fireproof construction. The roofs of all buildings shall be covered with incombustible material or shall be of tar and slag or plastic cement supported by or applied to arches of fireproof material and the cornices shall be constructed of incombustible material

The letter calls attention to the fact that, according to the above law, slag or gravel roofs would not be approved for covering factory buildings, more than one story in hight, where the roof deck was of board sheathing, and then the letter continues:

"Slag or gravel roofing could only be applied on factory buildings of two, three and four stories, where the roof deck was constructed of fireproof material; in other words, brick, tile, terra cotta or reinforced concrete.

"After presenting our arguments to various members of the State Labor Commission, they admit the injustice of requiring a fireproof roof deck on non-fireproof buildings. We have also convinced them that a slag or gravel roof is one of the best fire retardant roof coverings that can be obtained, and they have promised us that they will make an amendment to the law which will permit of the use of slag or gravel roof on factory buildings four stories and under, where the roof deck is of board sheathing.

"Since the enactment of this law several cases where slag roofs have been rejected have come to the attention of the association, and, in order that we may keep in close touch with the matter, please advise us promptly of each case that is brought to your attention where a slag or gravel roof is rejected on account of its not being considered an incombustible roof."

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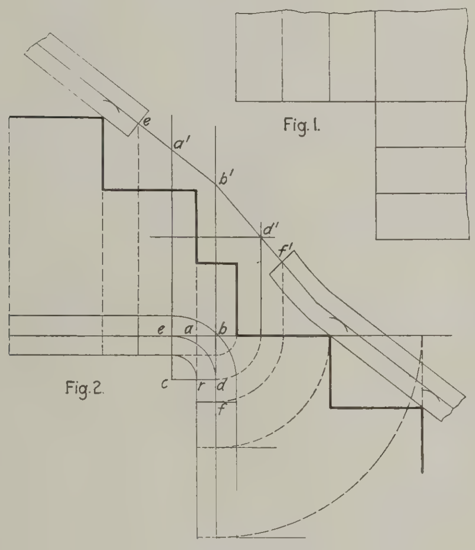
Constructing Oak Handrail for Stone Stairs

One of the problems which confronted an English builder not long since was the construction of an oak hand rail 4 x 3 in. in cross section and the attaching of it to a stone staircase having a quarter space landing. A correspondent of the *Building World* offered the following solution of the problem accompanied by sketches which are here presented for their interest to American readers.

The plan shown in Fig. 1 is set out as indicated in Fig. 2. It is presumed that the outer side of the rail will be plumb with the outer ends of the steps. Then a radius c-r up to $2\frac{1}{2}$ in. will allow sufficient space under the rail for the panels.



Figs. 1 and 2—Plan and elevation of the stairs

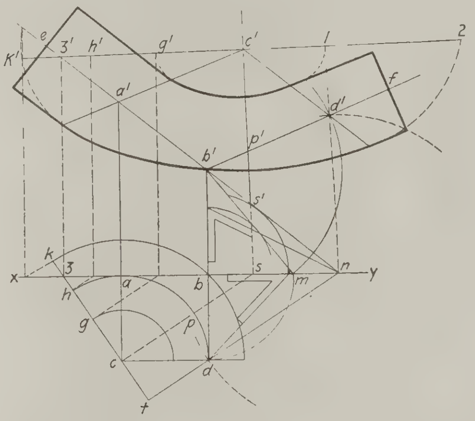


Fig. 3—Development of the face mold and bevels for the wreath

Constructing an Oak Handrail for Stone Stairs

Next set out the development of the tangents which show the two pitches of the wreath and ramp respectively, joining the lower straight rail.

In Fig. 3 is shown the layout of the face mold and bevels for the wreath. Having drawn the plan of the wreath and the plan and development of the tangents as indicated extend a'-b' to n in x-y; join n-d which is the horizontal trace.

Obtain the point d' as shown, and draw the tangent $b'\,d'$. Draw $c\,s$ parallel to n; project up for s', then draw $s'\,c'$ parallel to n d' then $s'\,d'$ is the direction of the minor axis.

At right angles to $n\,t$ draw $t\,k$ through c (this is the plan of part of the major axis). From 3 project up and obtain 3′, then through $3'\,c'$, and produce each way, and thus obtain the direction of the major axis.

Project parallel to $t\,n$ from $k\,g$ to $x\,y$, next vertically to $n\,e$, and then parallel to $n\,d'$, which gives $k'\,g'$, and thus $c'\,g'$, $c'\,k'$, are half the major axes for curves. Make $c'\,p'$ equal to $c\,p$, and mark off half the breadth of the rail on each side of p'.

Half the minor axes are obtained as shown, and then the face mould can be completed in the usual manner.

With b as centre draw an arc touching $b'n$, and where it meets $x\,y$ join to d; this gives the bevel for the upper joint e. With b as centre draw an arc touching $b'\,m$, and where it meets $b\,b'$ join to n, which gives the bevel for the lower joint.

◆

Free Manual Training School for Pullman Employees' Children

According to announcement made by the Board of Directors of the Free Training School of Manual Training at Pullman, Ill., ground will be broken within a month or two for the first group of buildings as outlined by C. F. Johnson, architect, and Dr. Laenas Gifford Weld, principal of the school. The late George M. Pullman left a fund of $1,200,000 to carry on the work of free manual training for children of the Pullman Company employees, and the fund has increased to $3,000,000. By the terms of the will there will be instruction for both boys and girls. For the former there will be classes in carpentry, pattern making, blacksmithing, machine shop work, operative engineering and electrical installation, in addition to academic courses suited to the purposes of a technical trade school.

◆

According to official figures, no fewer than 9,284 buildings were completed in Sydney, New South Wales, last year, thus establishing a new record. These figures compare with 8862 buildings in 1912, which up to that time held the record. The demand for houses in Sydney and its environs is said to be very great.

◆

Rudolph P. Miller has had the honorary degree of Master of Science conferred by Columbia University in recognition of his valuable public services as Superintendent of Buildings of New York and in the preparation of its building laws.

A Country House of Seven Rooms

A Frame Dwelling of Compact Arrangement—Details of Construction with the Principal Items of Cost

WE have taken for the subject of our colored supplemental plate this month a country house of frame construction and having an interior divided into seven rooms and bath. The living room extends entirely across the front of the house and from it rises the main flight of stairs lighted by a double window at the first landing. At the extreme right casement windows open on to a side porch. The main entrance door is directly opposite an open fireplace of neat design.

Beyond the living room is the dining room with bay window, open fireplace and built-in china closet. At the left of the dining room is a commodious pantry and beyond it the kitchen which is entered from a rear porch. The sink is placed directly under one of the windows which affords ample light and just beyond the sink is a niche for the refrigerator. From the pantry leads the stairs to the cellar and over these is the rear flight to the second floor.

In the second story are four sleeping rooms and bath, one of the front rooms being provided with an open fireplace.

Some Details of Construction

According to the specifications of the architect the foundation walls are of concrete 12 in. thick and having concrete footings extending 6 in. on both sides of the walls. The superstructure is of frame, the main plate being 6 x 8 in. and halved at the corners. The first floor beams are 3 x 10 in. and the second floor beams 2 x 10 in. doubled around all openings and hung in stirrup irons. The studs are 2 x 4 in. and the rafters 2 x 8 in. placed 16 in. on centers. The outside frame is covered with matched diagonal sheathing over which is placed a layer of building paper, and this in turn covered with clapboards 10 in. wide. The rafters are also covered with sheathing boards over which is a layer of building paper and on this are laid cypress shingles exposed 5½ in. to the weather.

The interior trim is of cypress with plain facias and soffits. The floors throughout are double, the finish floor being of comb-grained maple.

The Plaster and Tile Work

The walls and ceilings of the rooms are plastered with three coat work. The cellar walls are white washed and the ceiling plastered rough finish.

The bath room has a floor of white hexagonal tile laid upon a concrete bed. The walls are wainscoted with tile for a hight of 4 ft. above the floor and have neat cove and base. The fixtures are of enameled iron properly connected with all necessary fittings.

The mantels in the rooms where fireplaces are shown are of pressed brick with hearths and backs of fire brick. The chimneys are of selected common brick resting upon a footing of 10 in. of concrete. The flues are lined with flue tile and the chimney where exposed above the roof has two coats of stucco finish.

The gutters are of the half round pattern suspended in adjustable gutter hangers placed every 4 ft. The leaders are 3 in. in diameter and are made of No. 24 galvanized iron.

The house is heated by hot air furnace of sufficient capacity to guarantee 80 degrees Fahrenheit in the coldest weather. The hot air pipes are carried up in the stud partitions, the studs being covered with metal lath for 2 ft. on both sides.

The house is provided with wiring for electric lighting and is piped for gas supply. Fixtures are of the combination type, are of dull bronze finish and plain design. The hardware for locks, doors and windows is of a dull bronze finish and of early Colonial pattern.

All exterior trim has three coats of linseed oil paint. The shingles on the roof received two coats of Cabot's shingle stain well brushed on and worked into the joints. The first and second floor interior trim is grained and varnished.

The cost of the house based on cubical contents is as follows:

House 30 x 34 x 25 ft. average hight equals	25,500 cu. ft.
Cellar 30 x 20 x 6 ft. average depth equals	3,600 cu. ft.
Total	29,100 cu. ft.

Figuring this at a unit price of 19 cents per cubic foot gives a total cost of $5,529.

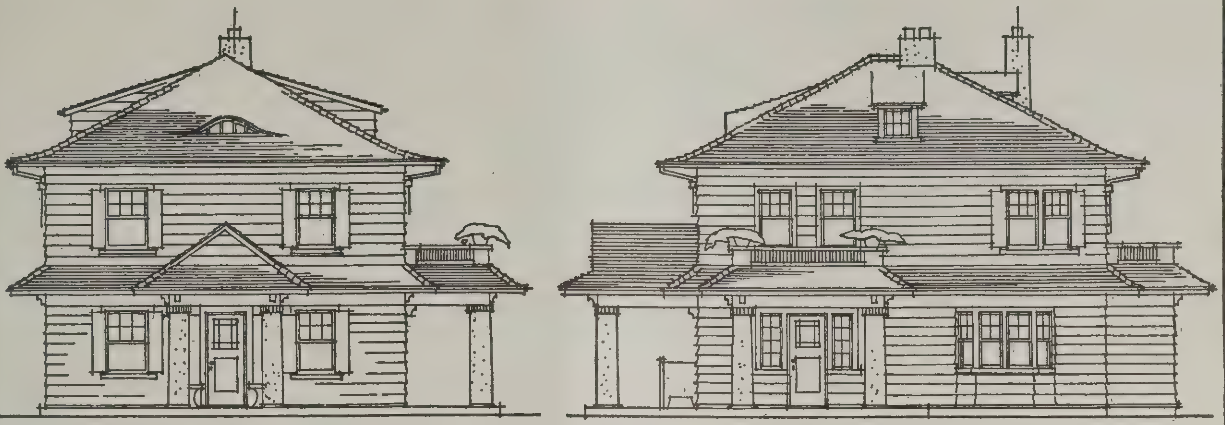
Estimate of Cost of Labor and Material

The various classes of work and labor involved in connection with the house show the following figures of cost:

Excavating	$180
Grading	60
Masonry	250
Concrete and cement (foundations, etc.)	470
Plastering	359
Mill work and corpentry—framing	2,520
Painting	320
Plumbing	350
Heating	400
Metal work	180
Tile work	40
Mantels	80
Gas and electric work	250
Hardware	70
Total cost	$5,529

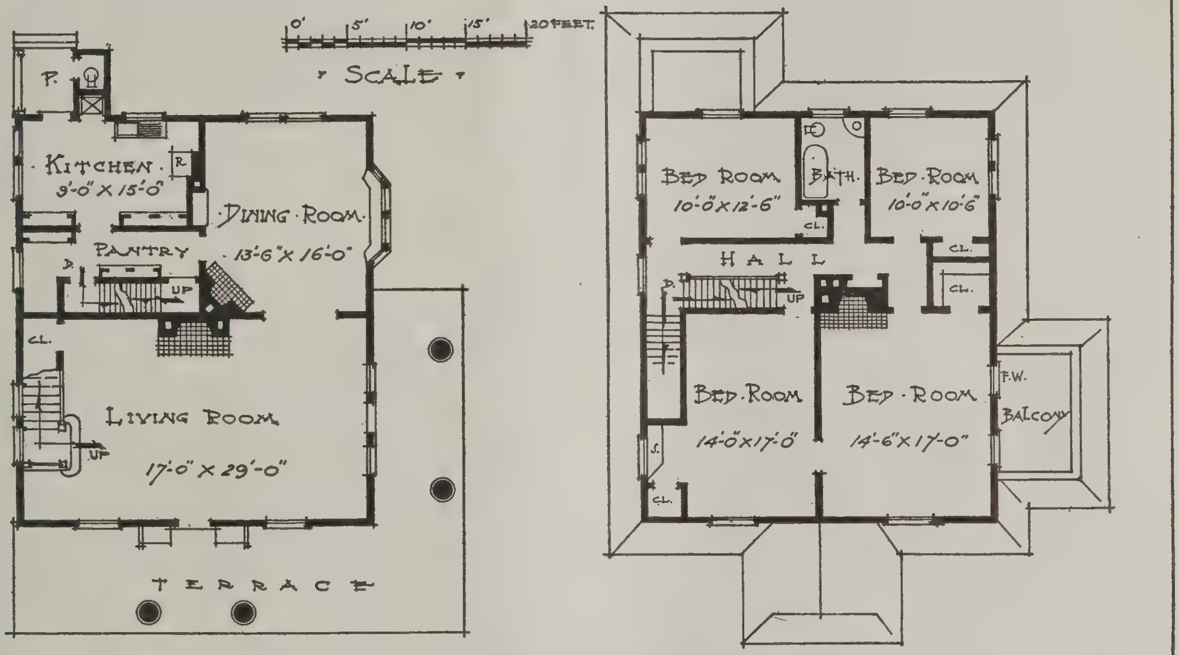
The plans and specifications for this country house were prepared by Architect Frank T. Fellner, care of *The Building Age*, 239 West 39th street, New York City, or 413 Caton avenue, Brooklyn, N. Y.

An interesting feature in connection with the new church edifice which is to be erected at Lexington avenue and 66th street, New York City, and which will cost $500,000, is that it will be built around the old church which now occupies the site. The usual services will continue in the old building while the new one is being erected just outside the four walls.



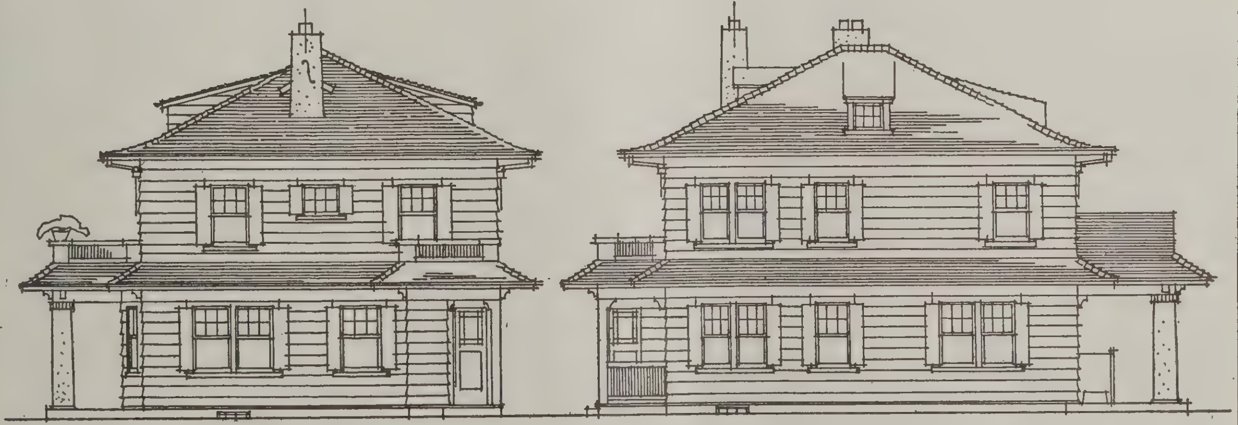
· FRONT · ELEVATION ·

· SIDE ELEVATION ·


0'
5'
10'
15'
20 FEET.
· SCALE ·
P.
KITCHEN · 9'-0" X 15'-0"
R
PANTRY
DINING · ROOM · 13'-6" X 16'-0"
UP
CL.
LIVING ROOM 17'-0" X 29'-0"
UP
TERRACE
BED ROOM 10'-0" X 12'-6"
BATH.
BED · ROOM 10'-0" X 10'-6"
CL.
HALL
CL.
CL.
UP
BED · ROOM 14'-0" X 17'-0"
BED · ROOM 14'-6" X 17'-0"
F.W.
BALCONY
CL.

· FIRST · FLOOR · PLAN ·

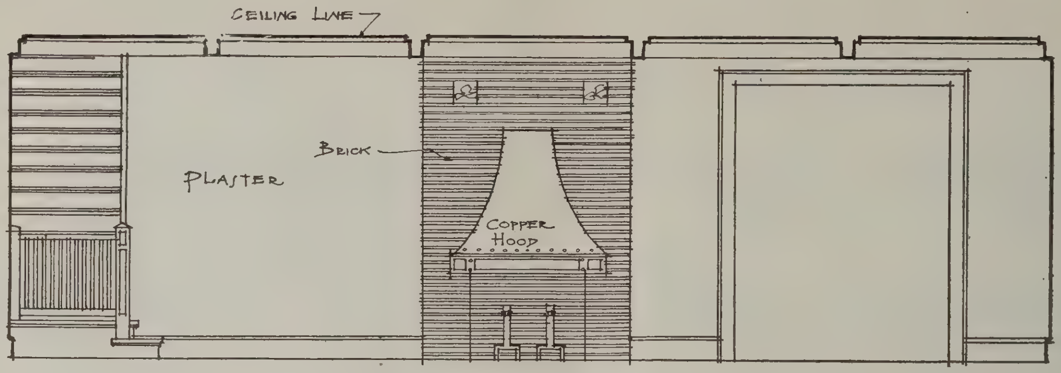
· SECOND · FLOOR · PLAN ·



· REAR · ELEVATION ·

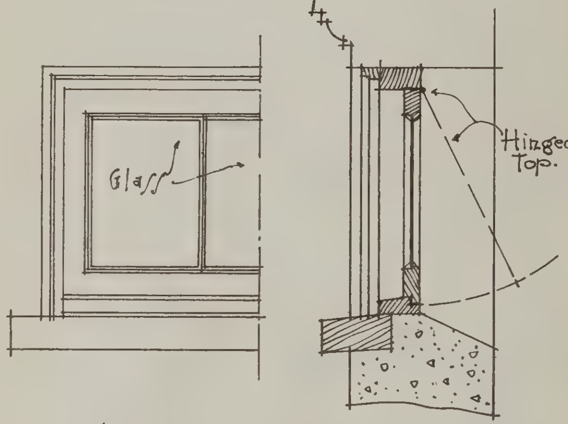
· SIDE ELEVATION ·

Plans and Elevations of the Country House Shown on Our Supplemental Plate This Month



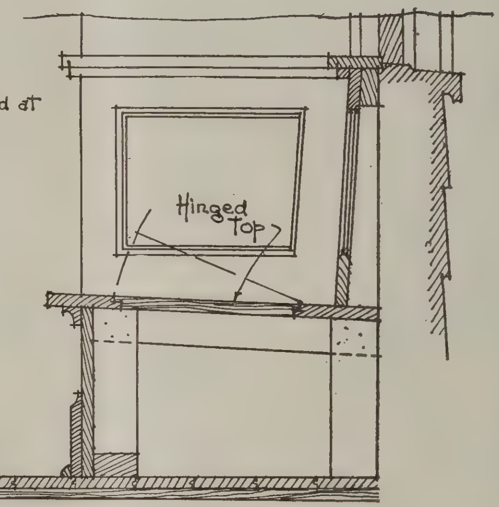
ELEVATION · OF · LIVING ROOM

SCALE 0 1 2 3 4 5 6 FEET.

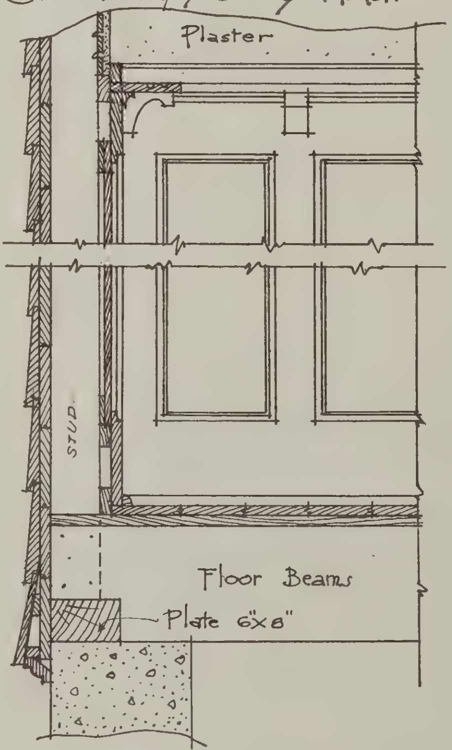


ONE-HALF ELEVAT'N · SECTION

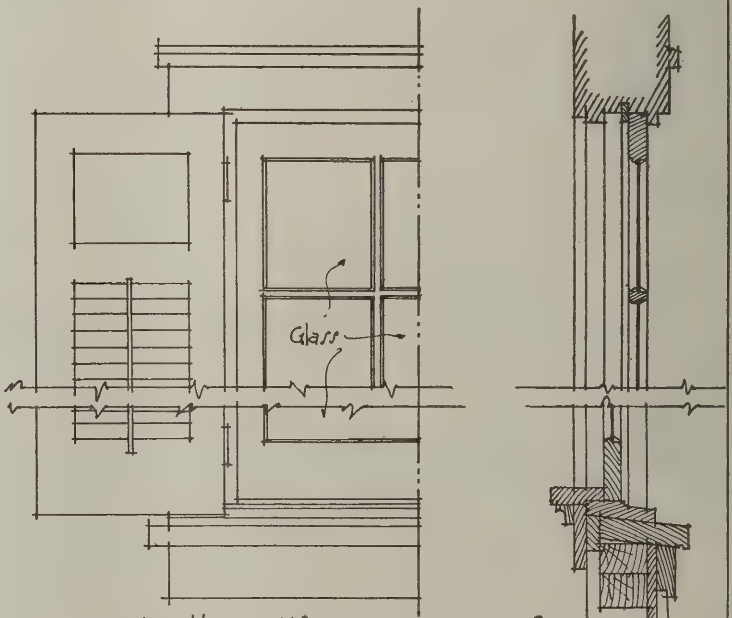
CELLAR · WINDOW · DETAIL



DINING · ROOM · SEAT · DETAIL



MAIN · WALL · CONSTRUCTION · & · DINING · ROOM · PANELING



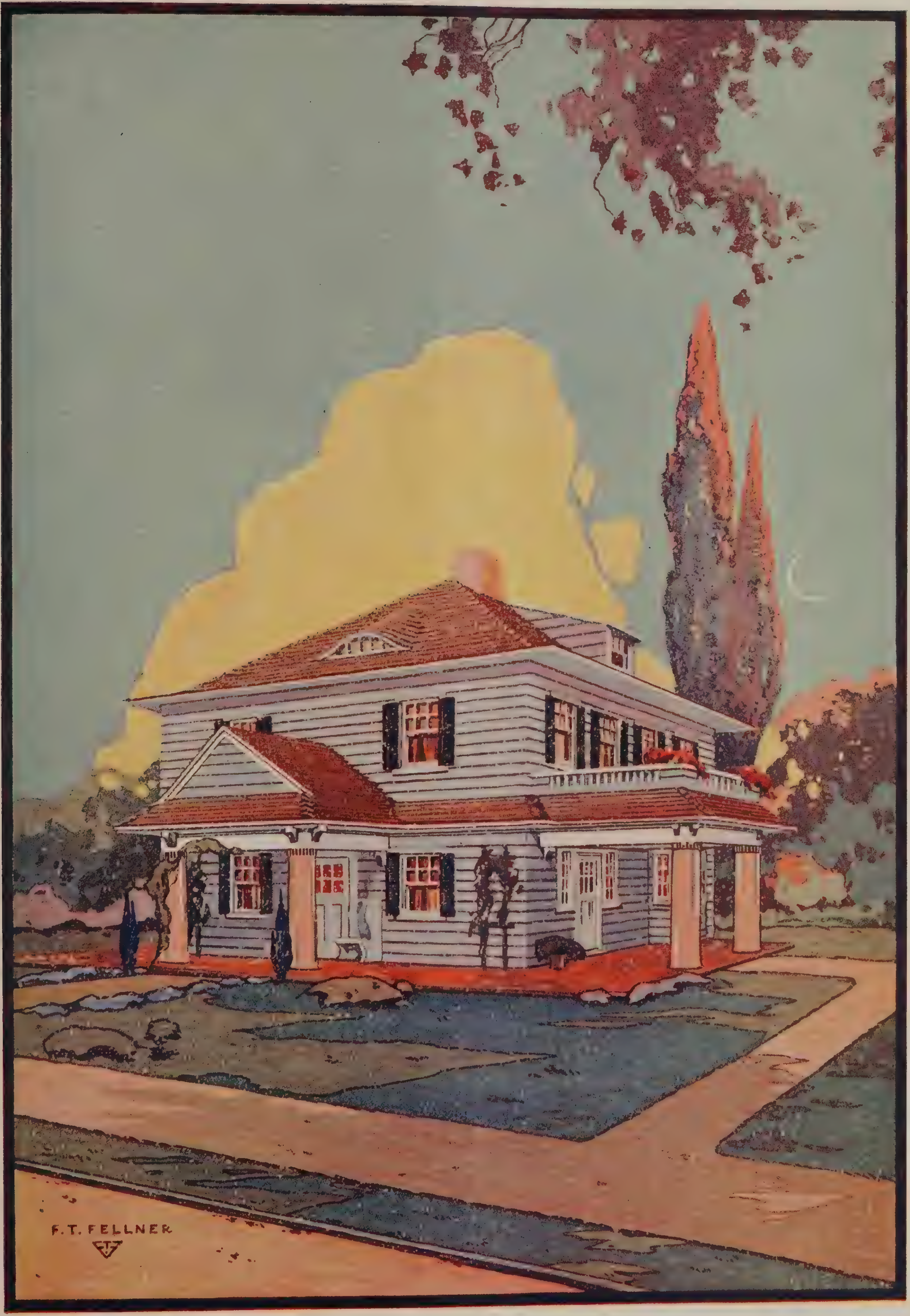
ONE-HALF · ELEVATION · SECTION

DOUBLE · HUNG · WINDOWS

SCALE · FOR · DETAILS

0 1 2 3 4 FEET.

Miscellaneous Constructive Details of Country House Shown on Our Supplemental Plate This Month



BUILDING AGE
NEW YORK

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Drawing Windows of Gothic Design

Some Suggestions for Laying Out Complicated Window Tracery in the Gothic Style of Architecture

By Alfred Auslander

In Fig. 7 is shown a form similar to that shown in Fig. 6, except that the upper arcs *F-C* and *G-C* in Fig. 6 become straight lines in Fig. 7. This form of the pointed arch developed in the late English Gothic and is known as the Perpendicular.

Besides the pointed arch, there were certain other geometrical forms often used in Gothic windows. These, from their likeness to the lobes or leaves of the clover were known as the trefoil, quatrefoil, cinquefoil, etc., according as the numbers of leaves or foils was three, four or five.

The form shown in Fig. 8 is called a trefoil and is obtained by means of three equal circles, the centers of which are located at the points of an equilateral triangle. The simplest method of drawing an equilateral triangle of which *A-B* is one side, is to use *A* and *B* as centers and with radii equal to *A-B* describe the arcs *A-C* and *B-C* intersecting at *C*. Then *A-C* and *B-C* will be equal to *A-B* and to each other, and the triangle, *A-B-C*, will have sides of equal length—that is, will be equilateral. Then from the points *A-B* and *C* of this triangle circles of equal radii may be drawn, as *F-D*, *D-E* and *E-F*.

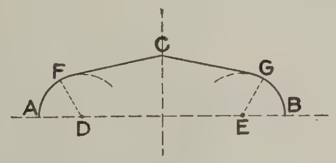

Fig. 7—The Perpendicular Arch

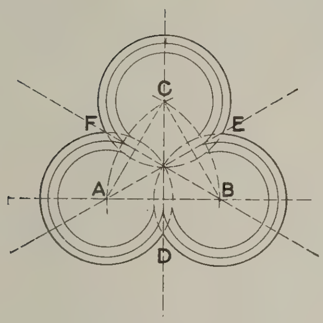

Fig. 8—The Trefoil

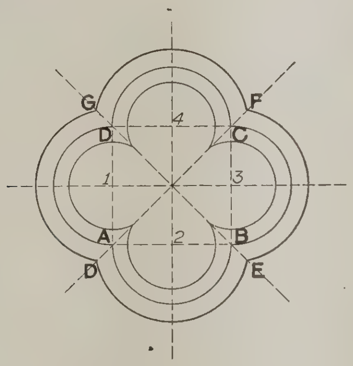

Fig. 9—The Quatrefoil

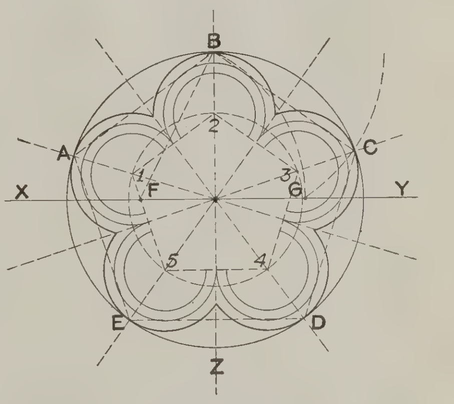

Fig. 10—The Cinquefoil

Drawing Windows of Gothic Design—By Alfred Auslander

According to the length of the radius chosen these circles may intersect, or just touch—that is, be tangent—or not intersect. In Fig. 8 the outer circles in heavy line are circles that intersect each other at points *F*, *D* and *E*.

In Fig. 9 is shown the quatrefoil, which is obtained by means of four equal circles, the centers of which are symmetrically located on the four sides of a square. Thus let *A, B, C, D* be a square. From the middle points of its sides, *1, 2, 3* and *4*, used as centers, describe circles of equal radius, intersecting at points *D, E, F* and *G*, which happens when the diameter of the circles is more than the side of the square. The diameter may be made just equal to the side of the square and also less than the side of the square as shown in Fig. 8.

In Fig. 10 is shown the cinquefoil, obtained by means of five equal circles the centers of which are located on the extremities of a pentagon or polygon of five equal sides. A pentagon is most easily drawn as follows: Draw a circle *A, B, C, D, E*, of which the vertical and horizontal diameters are *B-Z* and *X-Y*. Divide the horizontal radius in two equal parts by the point *F*. From *F* as center with radius *F-B* describe arc *B-G* and from *B* as center with radius *B-G* describe arc *G-C*. Where this arc cuts circle as at *C*, the line *B-C* joining *B* and *C* will be one side of the pentagon, and *C-D, D-E, E-A* and *A-B* the four others. Draw five diameters of the circumscribed circle through the points *A, B, C, D* and *E*. On the diameter *A* select a point 1 as a center for one of the leaves of the cinquefoil, and describe arcs of circles as shown, and then from centers 2, 3, 4 and 5 located at equal distances from *B, C, D* and *E* and equal also to *A-1* draw the small circles shown with same radii as used from center *1*. It will be seen that these centers are at the extremities of a pentagon *1, 2, 3, 4, 5*. These small circles may either be tangent, intersect or not intersect, as was the case in the trefoil and quatrefoil. The interior points of the foils are known as cusps. Of course any number of divisions besides three, four and five may be made.

In the large Gothic window shown in the plate eight are used in the large circle in upper part of window.

These foil designs also made use of the pointed arch form instead of the circle. This will be made clear enough by Fig. 11, which shows a trefoil so designed, and a comparison with Fig. 8 will show the difference.

In Fig. 11, draw the equilateral triangle *A, B, C* and the lines *A-E, B-D* and *C-F*, bisecting the sides of the triangle. From *A* as center and radius *A-B* describe the arcs *B-F* and *C-D*, and from *B* as center the arcs *A-F* and *C-E*, and likewise from *C* as center the arcs *B-E* and *A-D*. This gives the three foils *A-F-B, B-E-C* and *C-D-A* which are pointed arch forms symmetrically disposed about an equilateral triangle.

The complete foil designs were used in a decorative way to fill spaces as is shown in the large window on page 43 of the June issue, but forms derived from or suggestive of the trefoil and cinquefoil were used in connection with pointed arches to form the heads of windows. Thus in Fig. 12 the head of the window is formed of two sides of a perfect trefoil and the head shown in Fig. 13 is certainly suggestive of the cinquefoil. These might be described as foliated windows.

In the western gables of the cathedrals large circular or wheel-like windows were used by themselves and are known as *rose* windows. The design of a rose window is rather too elaborate to illustrate here. Having become familiar with some of the forms used in Gothic windows it will now be interesting to consider some of the windows themselves.

In the beginning and before the general use of painted glass, the windows were small and simple. The width in proportion to height varied, being rarely less than one-fifth and often only one-tenth.

In Fig. 14 is a single window of the simplest Gothic type. The next step was to group these single windows as in Fig. 15, with a round opening above and moulding in pointed arch form enclosing the three openings. Likewise three narrow windows were grouped together under one large pointed arch as in Fig. 16, and the space above began to be filled in some decorative way as with circles inclosing foil patterns. The piercing of the space above the grouped windows is the beginning of what is known as *tracery*. Where the space between the windows is relatively large, and the stone slab or plate above them is pierced with simple decorative openings, we have what is known as plate tracery as in Figs. 15 and 16.

(*To be continued*)

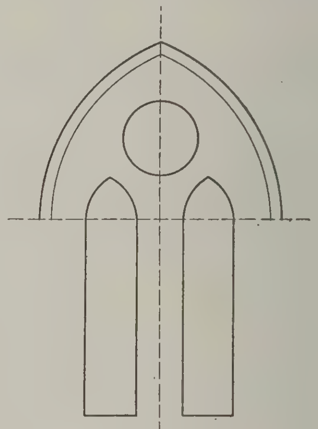
Fig. 15—Two Single Windows Grouped Under Arch

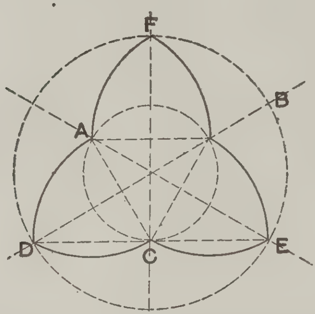

Fig. 11—A Trefoil with Pointed Arch

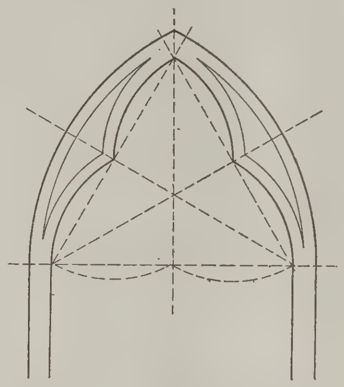
Fig. 12—A Foliated Window

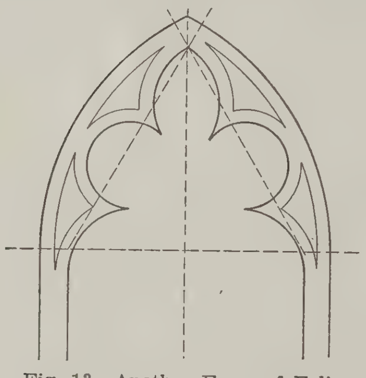
Fig. 13—Another Form of Foliated Window

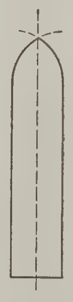
Fig.14—Single Window of Gothic Type

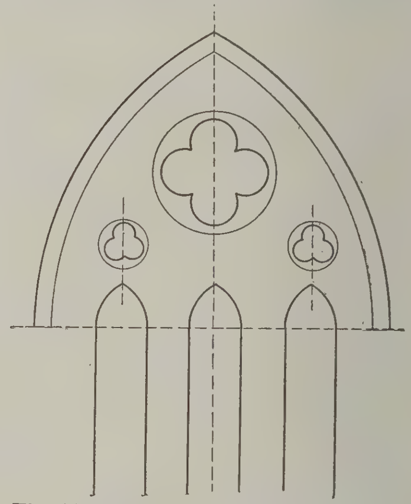
Fig. 16—Three Narrow Windows Grouped under One Large Pointed Arch

Drawing Windows of Gothic Design—By Alfred Auslander

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Cost Accounting on Construction Work

The paper read by Leslie H. Allen before the Boston Society of Civil Engineers, in March, on the subject of cost accounting, is being reprinted and will be mailed gratis by the Aberthaw Construction Co., Boston, Mass., to anyone who asks for it. This paper is believed to be the first which has been presented on the principles and methods of cost accounting on construction work. It has been prepared with the idea of showing just how this procedure can be made to conserve the interest of both contractor and owner, particularly under the rapidly increasing use of the cost-plus-profit form of contract. It is at once flexible and accurate, and should make toward the best interests of all concerned.

Foundations for Stucco Houses

Why the Stucco Coat of a House Often Cracks and Practical Suggestions Designed to Overcome the Difficulty

By A. M. Wolf

In no other type of residence construction does a poor foundation manifest itself as forcibly and quickly as where stucco is used. The slight settlement of the foundation of a frame structure with ordinary clapboard siding does not show on the outside of the building, because the entire construction is more or less flexible and capable of conforming to the conditions brought about by settlement. In residence construction employing a wooden frame covered with stucco on wood or metal lath, or stucco on clay tile walls, the effects of settlement of the foundations are entirely different. The stucco coat, being comparatively rigid and inelastic, does not readily conform to the change in shape of the building due to settlement, consequently stresses are set up in the material which it is unable to resist and cracks in the stucco are the result.

The same indifference which marks the character of foundation construction for frame buildings is, in general, still prevalent where stucco buildings are erected. Too often we see stone foundations a foot in thickness extending 30 inches to 3 feet below the grade line. In this northern region, this is entirely too shallow to be free from the influence of frost. The writer has seen such shallow foundations heaved so badly during hard winters that in one case, the entrance doors in a two-story flat building could not be closed, the plaster was destroyed and the brick walls were so badly cracked over the door openings as to allow brick in the rowlock arches to be removed without trouble. In the spring, settlement took place and the doors had to be rehung; the cracks in the brickwork remained, however, as mute witnesses of the falseness of economy in building shallow foundations.

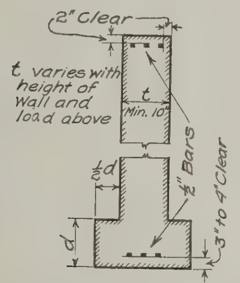


Fig. 1—Section of Concrete Wall

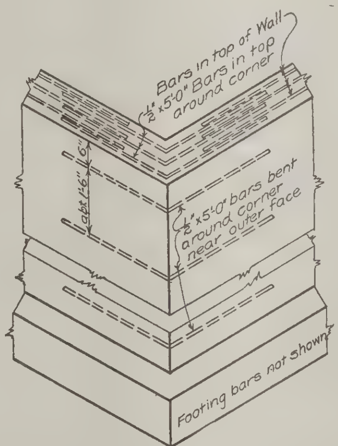

Bars in top of Wall
½"x5'0" Bars in top around corner
6"
abt 1'6"
½"x5'0" bars bent around corner near outer face
Footing bars not shown

Fig. 2—Showing Corner Reinforcement

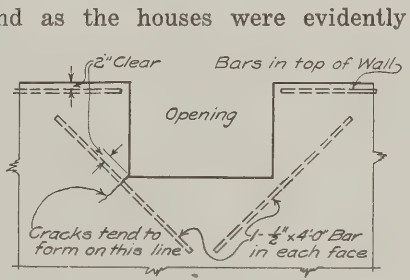


Fig. 3—Elevation of Wall at an Opening

Foundations for Stucco Houses—Various Methods of Overcoming Some of the Common Difficulties

The writer has in mind several houses of a group built by an investment company in a suburb west of Chicago, which now show very clearly the results of insufficient foundations—in this case under porches. The houses are of the bungalow type with overhanging main roofs, in most cases, extending over the porches. The load on the foundations under these porches should have been assumed as very nearly the same as if they were a portion of the main exterior walls of the house, the only difference being the omission of a small amount of wall load. Instead of building these foundations continuous, as they should have been, they consist of four posts, one at each corner, and two intermediate, made up of 8-inch conduit tile filled with concrete. There may be a footing course of somewhat larger size under these posts, but even so, they cannot be very large and in any case are inadequate. As a result of this design or rather very poor guess, the unit bearing on these porch footings is many times as great as that under the continuous wall footings and settlement took place, as is clearly indicated by the cracks at junction of the porch and the building wall. If continuous footings had been placed under these porches, no such settlement would have taken place, but this was not the idea in mind as the houses were evidently built "for sale" and were not built for "stability."

A point to be remembered in designing foundations for a stucco house is that the superstructure is very much heavier than for the ordinary frame construction and, therefore, for the same soil conditions, a larger bearing area is required. Bearing in mind that stucco, which on account of the shrinkage which takes place on hardening, is in tension (if not cracked) it can easily be seen that the slightest settlement will destroy the equilibrium and cause cracks. For this reason, the footings for such buildings should be made wider (that is, the allowable bearing on soil should be decreased) than those ordinarily used for residence work; and, as a further safeguard, they should extend well below the line to which frost is apt to penetrate.

To design and correctly proportion the foundation walls of a building, is a most difficult problem when handled on an engineering basis, on account of the difficulty in interpreting the true action under load because of lack of symmetry of the structure. It is, therefore, well to choose a low unit bearing on soil so that any inequalities in the loading will not exceed the value at which settlement begins. Just what bearing can be safely allowed on the soil in any particular locality is a question which must be settled by a study of the common practice and the general appearance of the structures; that is, if settlement cracks are visible or not. The wall footings should be so proportioned that the unit load on the soil is about 75 per cent of that ordinarily used.

Use of Reinforcing Material

In happy contrast to the houses with poor foundations above referred to is a residence—a stucco on wood frame and built in 1912—with continuous concrete footings under all walls and porches. There is an entire absence of cracks at such critical points where the unit bearing on the soil changes very rapidly due to difference in the load carried by various portions. The foundations for this residence did not, at the utmost, cost $150 more than a foundation in which a saving of concrete by the use of small piers under the porches would have been effected and it can be readily seen that the extra expenditure was entirely justifiable on account of the excellent results obtained.

When concrete foundation walls are used, the application of a few steel bars in the top and bottom will make the wall act as a beam and, therefore, tend to equalize the pressure at all points. Bars in the top of walls, ordinarily two or three ½-inch squares are sufficient to prevent cracks forming due to shrinkage while hardening and expansion and contraction due to temperature changes. In Fig. 1 is clearly shown the proper location of bars in concrete walls in order to prevent settlement and temperature cracks. The top bars should be at least 2 inches from the surface of the concrete. The bottom bars should, in general, be placed 3 or 4 inches above the bottom of the footing, since the concrete in that portion is of questionable quality, unless the soil is very firm and hard, and if less protection is given the steel, it is very likely to be subjected to rust. At the corners a few bars bent parallel with the intersecting walls will prevent cracks at the corners due to shrinkage and temperature stresses acting at right angles to each other. The arrangement of corner bars is shown in Fig. 2. The bent bars near the top of the wall should lap a distance of 30 to 40 diameters with the straight bars extending up to the corner. As a further safeguard against cracks in this portion of the wall, bent bars should be placed horizontally near the outer faces of walls from top to bottom, at a spacing of about 18 inches or 2 feet.

Cracks in foundations are sure to extend up into the stucco work and if cracks in foundations are eliminated, one source of trouble has been eradicated. For this reason, a concrete foundation wall 10 or 12 inches thick with a projecting footing course with light reinforcement is much better for a stucco house than an ordinary rubble masonry wall. If clay tile or cement blocks are used for the basement walls, the footing course should be of concrete not less than one foot thick with light reinforcement near bottom to aid in distributing the load to the soil. The footing should, of course, be of such width as to give the proper bearing on soil for this class of construction, as previously mentioned. The projection of the footing course on either side of the wall should not be made more than one-half the thickness of the course. It may, sometimes be necessary to increase the thickness of the footing in order to get the desired projection.

It is well to remember that wherever sharp corners or openings occur in concrete walls, cracks tend to develop due to shrinkage while hardening, a small amount of reinforcement judiciously placed around such corners or openings, will eliminate this trouble. Figure 3 is a detail sketch of suggested reinforcing around windows and similar openings, and needs very little explanation. Suffice it to say that the bars should not be placed too close to the surface of the concrete, that is, not less than 2 inches therefrom.

In regard to the matter of constructing concrete foundation walls, a few words may not be out of place. The concrete used should in all cases be as dense a mixture as it is possible to make, that is, the voids in all material should be filled. In this regard, it is well to remember that a rich concrete is cheaper than a special kind of waterproofing and in general, gives as good or better results. A few dollars paid out for extra cement to make a richer mixture is money well spent, as many can testify. Concrete walls, made of a wet, rich mixture (1 part cement, 2 parts sand and 4 parts crushed stone) well spaded and properly reinforced, as previously described, will be very nearly waterproof, without resorting to plastering, etc.

How the Concrete Should be Poured

All concrete should be poured in such a manner as to eliminate sloping joints, such joints materially weakening the wall. Bulkheads should be placed in the forms at such points as will permit the pouring of concrete in horizontal layers. When a few hours or longer time intervenes between pourings, a key should be made in the surface of the concrete first poured and all traces of scum and laitance removed before concreting is resumed. These precautions will prevent the seeping of water through the joints in the wall. The top line of wall should be carefully marked on the forms before concrete is poured, so that the walls can be brought up to the proper height and level without applying a plaster coat of varying thickness to the top of wall to obtain the correct height. Such work should not be allowed as it is unsatisfactory.

In the past, too little attention has been paid to the foundations for residences; in the most cases, they are simply guessed at, or taken from current practice, regardless of the type of house, kind of soil, whether conditions or other items of vital concern to this subject. Stucco is an excellent material for residence work owing to the ease with which it lends itself to artistic treatment, but as a material for quickly "showing up" the weak points in an architect's work, it stands without peer.

The Legal Regulation of Architects

Scope of Legislative Power—Effect of Licensing Statutes—Validity of Municipal Provisions

By A. L. H. Street

THE following observations will be found to supplement what I have previously written in *The Building Age* on the right of a state to regulate the pursuit of the architect's profession, as determined by court decisions on the subject.

None of these cases appear to disclose any serious dispute of the power of a Legislature, in seeking to protect the public against incompetent or unscrupulous architects, to limit the right to pursue that occupation to persons who have demonstrated their qualifications to the satisfaction of a board peculiarly well fitted to pass upon the question. And, as declared by the Illinois Supreme Court, a licensing act may validly provide for revocation of a license on the ground of gross professional incompetency or carelessness, or for dishonest practices. (102 Northeastern Reporter 193.)

Attack Against the Licensing Laws

The principal ground of attack against the licensing laws has been their provisions exempting certain persons from the necessity of procuring licenses required of architects generally, but the objection has been uniformly overruled. For example, in the case of People v. Lower, 96 Northeastern Reporter 346, the Illinois Act of 1897, which provides for the licensing of architects on examination and payment of a $25 fee, and which declares that any person engaged in planning or supervising the construction of buildings shall be deemed to be an "architect" within the meaning of the law, was attacked as being class legislation, because it provides that it shall not prevent any person from making plans for a building to be erected by himself or his employes. The Supreme Court refused to adopt this view, holding that all persons similarly situated are equally governed by the regulation.

The California Law Sustained

In another case, Ex parte McManus, 90 Pacific Reporter 702, the California law was sustained by the Supreme Court of that State, as against similar objection. That law, after providing for licensing of architects by a State board makes it a misdemeanor, punishable by a fine of not less than $50 nor more than $500, to practice architecture without a license, or to advertise as an architect, etc., except that unlicensed persons are permitted to plan their own buildings, or to furnish plans or other data for buildings for other persons, if the latter are notified that such unlicensed persons have not procured certificates from the State board. The court finds that this exception is not unconstitutional as conferring special privileges discriminatory against licensed architects. The theory adopted is that issuance of a license operates as a sort of guaranty to the public of the qualifications of the holder, but that there is no good reason why he should not take his chances in employing one known to be unlicensed, since the fact that the latter has no certificate is sufficient to place the employer on his guard as to the architect's competency. It was further objected in this case that the Legislature was without power to delegate to the State board authority to make rules governing the licensing of applicants. But the Supreme Court finds that this was a proper provision, since the members of the board must be presumed to be better qualified than the Legislature to pass upon the question as to what detailed requirements should be made to entitle an applicant to a certificate, and since any unreasonable rules or arbitrary action made or taken by the board will be subject to correction by the courts. It was, also, determined that the California law was not invalid because it provides for the selection of the members of the State board from the membership of the American Institute of Architects or some similar association.

Registration of Established Architects

In adopting the Illinois law providing for the licensing of architects, it was enacted that any person who should, by affidavit, show to the satisfaction of the State Board of Examiners that he was engaged in the practice of the profession of architecture at the passage of the act, should be entitled to a license without examination, on making application within six months after the passage of the law. In a suit brought to compel the board to issue a license to one who claimed to have been previously engaged in business (93 Illinois Appellate Court Reports 436), it was held that, although the board had no power to arbitrarily refuse to grant the license, it had some discretionary power in the matter of determining whether applicant had actually been engaged in the practice of architecture before the law was enacted; and that, although suit was proper to compel the board to act, the court could not direct how the board's discretionary powers should be exercised. But under a similar provision of the New Jersey law, it was held by the Supreme Court of that State, in the case of Cardiff vs. New Jersey State Board of Architecture, 54 Atlantic Reporter 294, that the board would be compelled to issue a license to one who proved that he had held himself out as an architect before the law was passed, and had supervised the construction of buildings and written magazine articles on architecture.

Effect of Noncompliance with Law

The validity of contracts made by unlicensed architects has been questioned in the courts. Under a California statute enacted in 1901 "to regulate the practice of architecture" and making it a misdemeanor for any person to pursue the occupation without a certificate, it was held by the District Court of Appeal of that State that although a contract for an architect's services could not be legally *performed* without his procuring the required certificate, the contract was not rendered invalid by reason of the fact that he had no certificate at the time the agreement was entered into. (Fitzhugh vs. Mason, 83 Pacific Reporter 282.) In a Canadian case (Beaulieu vs. Lapierre, 26 Quebec Official Law Reports 1) suit was brought to recover for services of an architect, and plaintiff relied upon the provisions of a provincial law authorizing the Quebec Association of Architects to fix a tariff for the services of members of the association, which when approved by the lieutenant-governor in council, and published in the Official Gazette, should be accepted in all courts as evidence of the value of such services, in the absence of written agreement to the contrary. Defendant claimed that there could be no recovery for the full amount claimed because the architect was not a member of the association, and partly relied upon another Quebec statute forbidding use of the title "architect" except by persons registered as members of the association. It was decided that in order to avail himself of the tariff of the association, in support of a claim for services, an architect must show his registration as a member of the association.

Power To Impose License Taxes

The power of a State to impose a privilege tax on the architect's business was upheld in Tennessee by the Supreme Court of that State in the case of Cook vs. City of Memphis, 30 Southwestern Reporter 742. The court said: "Again it is said that the occupation or business of an architect cannot be made a taxable privilege; that it is a profession requiring intelligence and brains, and these should not be taxed. Many of the occupants, if not all, that are taxed as privileges require more or less of intelligence and brains to successfully conduct them. We see no reason to make an exception in favor of architects. A privilege is whatever the Legislature chooses to declare and tax as such, and a positive prohibition of the power to prohibit is not essential to its validity." In a Missouri case, the power of a city (St. Louis) to require a license fee of architects was disputed on the ground that the provision in the charter of the city authorizing the taxation of specified occupations, not including architects, "and all other businesses, trades, avocations or professions," was not broad enough to authorize imposition of the tax. The Supreme Court, however, held against this contention, sustaining the tax. And the South Carolina Supreme Court has gone so far as to declare that an architect who has several contracts in a certain city for the preparation of plans and specifications and for the supervising of the construction of buildings there is subject to a tax imposed against architects doing business in the city, although his principal place of business and residence is in another city and the plans and specifications are prepared there. (Wilson & Edwards vs. City Council of Greenville, 43 Southeastern Reporter 966.)

New Building Superintendent for Borough of Manhattan, New York City

To fill the vacancy caused by the recent resignation of Rudolph P. Miller to take up the work of the new Building Code for New York City, Borough President Marks has appointed Alfred Ludwig to be Superintendent of Buildings for the Borough of Manhattan. The appointment of Mr. Ludwig, who has been Chief Inspector and Acting Superintendent since April 15th, has been made merely to avoid possible legal difficulties that may arise, as it is fully expected that Mr. Miller will return to the position of Superintendent of Buildings when his work with the Building Code is completed.

◆

Erecting the Steel Work of the New Equitable Building

According to computations which have been made by experts, the new Equitable Building now in course of construction in lower Broadway, New York City, will when finished be the heaviest office structure in the world. The new building will be about 160 x 312 ft. in plan and will rise to a height of about 500 ft. above the street level. The lowest point will be 65 ft. below the curb line and while it is to be considered as a 36-story building there will be intermediate floors at the third and thirty-fourth story levels which will make 38 floor levels.

The steel work of the building was erected to the second floor by six heavy steel guy derricks with 76 ft. masts and 65 ft. booms. The heaviest column erected weighed 32 tons. Above the second floor the heaviest member weighed about 16 tons and 15-ton derricks with 90 ft. masts and 85 ft. booms replaced the six just mentioned. The longer reach of the lighter derricks rendered them much more useful in handling material from the street.

The erection of the steel work was rendered unusually difficult by reason of extensive cross lot timber bracing which was designed to hold the basement retaining wall until sufficient steel work had been installed to take the load. It was necessary to set the derricks and with them erect the steel work for the three stories underground, all without damage to this extensive bracing.

After the steel work west of certain wall columns had been erected the derricks were used to erect the basement steel work eastward, drawing forward along the basement steel frame and erecting the steel work ahead, much after the movement followed in the use of a "traveler." In this way liability of accident to the cross-lot bracing was reduced and the expense of building supports for the derricks was eliminated.

◆

A new style of six-story apartment house has recently been introduced in Rue Vavin, Paris, France. Each story retrogrades on the one below, leaving a wide balcony or terrace in front of its windows. The house has a distinct resemblance to a huge flight of stairs and it is argued that the hygienic advantages of such a method of construction quite compensates for the waste of space.

CORRESPONDENCE

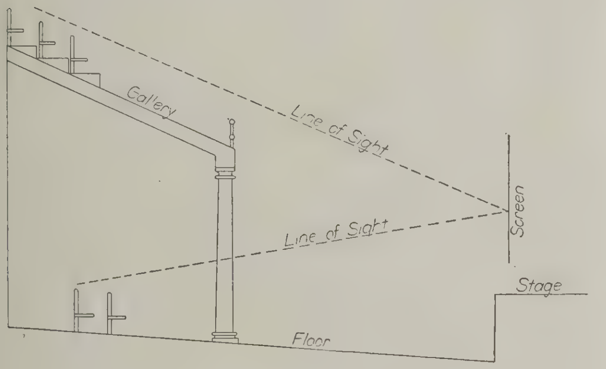
A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

Deadening a Floor

From W. A. K., Toronto, Canada.—Will some of the readers who have had practical experience in this line of work tell me the best way to deaden a floor above a store, the latter having metallic ceiling attached to the joists? There is a single floor above the store and I want to know if the deadening can be accomplished without filling in between the joists with mortar and cement.

Features of Hall for Moving Pictures

From Contractor, Redford, N. Y.—In regard to the problem of "A. A. S.," Sunapee, N. H., I would make the first floor of the hall level and elevate the stage 4 ft. or 5 ft. This will permit the hall to be used for other purposes and at the same time it gives a good view of the stage and screen. The gallery should be 15 ft. above the floor at the back but should coincide with the line of sight as indicated in the accompanying sketch.



Features of a Moving-Picture Hall

Flemish Bond in Brick Work

From H. B., West Pittston, Pa.—I have followed with much interest the questions and answers which have appeared in the Correspondence Department of the paper and I am disposed to offer a few comments concerning one which now comes to mind but which appeared some months ago. It was in connection with a brick pier 23 in. wide.

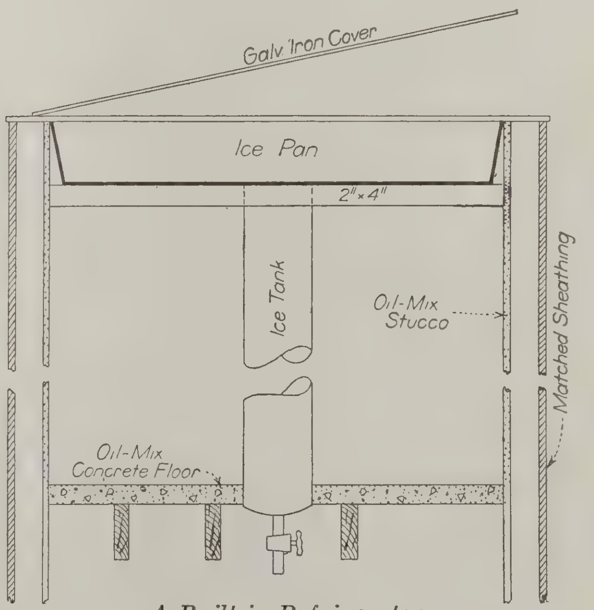
I doubt very much if any journeyman bricklayer or architect answered the question as nine times out of ten in such a case we mason contractors would stretch the pier to 24 or 24½ in. and make it work the bond. If it occurred between two windows we would move the frames to give sufficient room to get the right bond. If it was not permissible to move the frame then carry the joints plumb over one another from the work below the sills and let the piece come on the jamb.

One correspondent in the course of the discussion said that a building in Newark—I think he said the Lackawanna railroad station—had a piece of brick or bat on the corner. If so, the bond is wrong. Sometimes a man gets a corner and an angle mixed up. Perhaps it was in an angle that the brother meant.

A Built-in Refrigerator

From D. P. Barry, Redford, N. Y.—In the February issue of the paper "W. S. P.," Pottsville, Pa., asked for information regarding the construction of a built-in refrigerator and seeing that no one has thus far helped him out I am sending a vertical cross section of a refrigerator that will give satisfaction. The size, of course, is optional.

The ice pan, which forms the entire top, must be air-tight and supported on 2 x 4-in. joists as shown. The inside may be finished as drawn or in lumber, according to preference. The ice tank opens into the bottom of the pan. A 2-in. stop cock is placed below the floor, and both the pan and the stop cock must be easily accessible.



A Built-in Refrigerator

The tank is filled with crushed ice and a few inches deep in the pan. As the ice melts in the pan it runs into the tank. When the water in the tank become warm the stop cock is opened and the water drawn off. The cock must be large enough to let out any dirt which may accumulate in the tank. When the ice is put in the tank frost soon forms on the outside of it and things will freeze near it. A hollow door is placed so that it will open into the room where the refrigerator is used. The inside of the refrigerator is shelved to suit domestic requirements and ice may be set in pans on the shelves in case of need.

For moderately sized refrigerators a small light of glass should be placed near the top in a sliding frame with screen outside. When a large fresh or warm piece of meat is placed in the refrigerator it is necessary that the warm air be let out.

Obtaining Cuts of Gable Rafters

From C. G., Ithaca, N. Y.—In the April issue of the paper a correspendent signing himself "W. X. Y. Z." asks "how to get the proper bevel or cheek cut on the foot of a gable rafter, as, for instance, where a small gable is planted on the slope of the main roof merely for appearance sake from the outside."

The accompanying sketch, Fig. 1, may be helpful to him. There are two pitches shown, the main pitch being one-half pitch and the planted gable three-tenths pitch, although the pitches might have been reversed or any others chosen.

In the main roof the rise is 12 in. to a 12-in. run, and to meet this rise of 12 in. the planted gable rafter, being of three-tenths pitch, would have to run 16 in., therefore the length of the planted gable rafter would have to be 20 in. to every 12 in. of rise.

Now the length of the ridge of the planted gable part is equal to that part consumed of the run of the main rafter necessary to meet the intersection of ridge and main roof, which in this instance is 12 in. If the pitch of the main roof had been different the figure would naturally have been changed.

Now if we draw to the line *A-C* a perpendicular *A-B*, equal to such part consumed, that is, 12 in., and connect *B-C* we have a right triangle *B-A-C* representative of the plane of one side of the planted gable roof and in which *A-B* represents the ridge, *A-C* the rafter and *B-C* the valley. The angle *A-C-B* represents the cheek cut and the angle *A-B-C* the cut for the roof boards. Let the members of the steel square be representative of the ridge or run of the main rafter and rafter respectively. Then to get the cheek bevel cut on the representative of the gable rafter and for the roof boards cut on the other member.

The trouble among carpenters with such problems lies in the fact that the rafter is a skeleton and does not fill up the plane of the roof. If one would conceive in this instance of the whole right triangle *A-B-C* to be filled in completely with jack rafters it would be easy to see that they fit against the valley *B-C* at an angle *A-C-B*.

From C. J. M., St. Johns, N. F.—In the Correspondence columns of the April issue of the paper "W. X. Y. Z.," of Westfield, Mass., wants to know how many of his brother chips can make a drawing showing the proper bevels at the foot of a rafter when a small gable is planted on the slope of the main roof, as, for instance, a hog back or cricket behind a chimney. Well, I hope for the honor of the craft that there are many who can solve this very simple geometrical problem, still I know there are some who cannot and for their benefit as well as that of the correspondent in question I will give my method of doing the work.

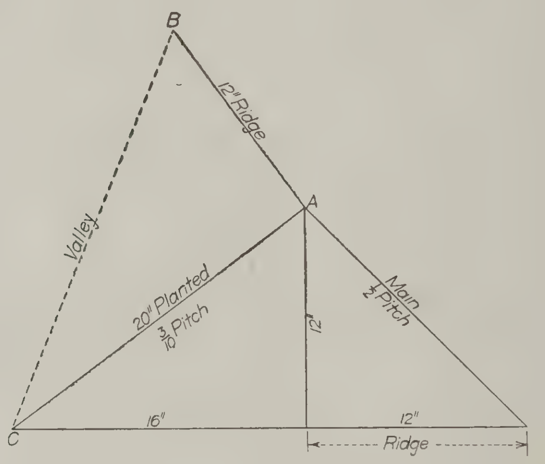


Fig. 1—Method Suggested by "C. G."

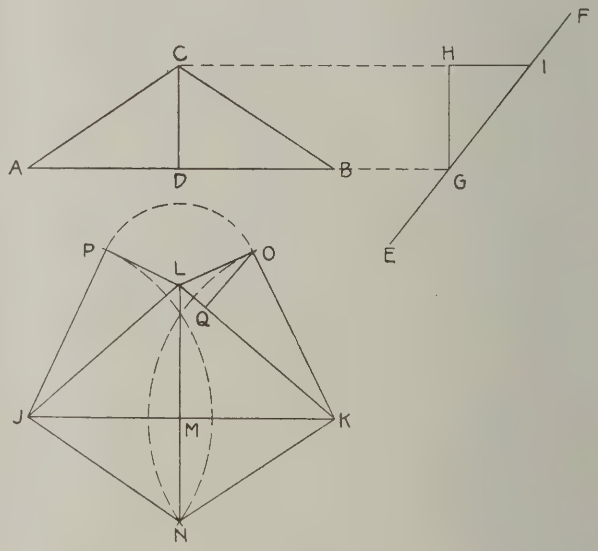


Fig. 2—Diagrams Submitted by "C. J. M."

Obtaining Cuts of Gable Rafters—Methods Suggested by Various Correspondents

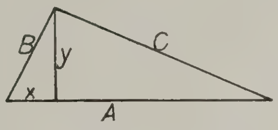
Referring to the accompanying diagrams, Fig. 2, draw to a scale of 1 in. to the foot the triangle *A-B-C* to represent the elevation of the front of the gable. Draw indefinitely the line *E-F* to represent the slope of the main roof. Draw the vertical line *G-H* equal to *C-D* and at right angles to it the line *H-I*, then the triangle *G-H-I* will be a vertical section of the structure. Next draw the triangle *J-K-N* equal to *A-B-C*. Make *M-L* equal to *G-I* and draw *J-L* and *K-L;* then the triangle *J-K-L* will be the plan of the structure on the slope of the roof.

Now with *L* as center and *H-I* as radius and with *J* and *K* as centers and *J-N* and *K-N* as radii describe the dotted arcs intersecting at *P* and *O*. Draw *J-P* and *K-O*. Then the triangles *J-P-L* and *K-O-L* are the covering of the sides.

Now, as the front of the rafter comes within the plane of the front of the gable and as the original diagram is drawn to a scale of 1 in. equal 1 foot, then *M-K* on the blade and *M-N* on the tongue of the steel square give the cut on the front of the rafter. As the back of the rafter comes within the plane of the covering, the back or side bevel is obtained from the triangle *K-L-O;* thus at right angles to *K-L* draw *O-Q;* then *O-Q* on tongue and *Q-K* on blade give the bevel for the side cut, marking by the blade in each case.

In the diagram we have to trust to the scale for the length of *Q-O.* We know that *K-O* is the length of the rafter; *L-O* is the length of the ridge and *K-L* the length of the valley, but *Q-O* is an unknown quantity until it is drawn and measured by scale. If carefully drawn it will be sufficiently correct for all practical purposes.

If, however, it is required to be exact the length of *Q-O* and *Q-L* may be determined by calculation using the following formula:



Given ABC sought xy

$$x^2+y^2=B^2$$
$$(A-x)^2+y^2=C^2$$
$$x^2+y^2=B^2$$
$$A^2-2Ax+x^2+y^2=C^2$$
$$\cancel{x^2}+\cancel{y^2}=B^2$$
$$\cancel{x^2}+\cancel{y^2}-2Ax=C^2-A^2$$
$$Ax=\frac{B^2-C^2+A^2}{2}$$
$$x=\frac{B^2-C^2+A^2}{2A}$$

$$y^2=B^2-x^2$$
$$y^2=B^2-\left(\frac{B^2-C^2+A^2}{2A}\right)^2$$
$$y=\sqrt{B^2-\left(\frac{B^2-C^2+A^2}{2A}\right)^2}$$

Why Walls Crack Outside and Not Inside

From D. P. Barry, Redford, N. Y.—It is quite probable that the troubles of "C. K. S.," Wayland, Iowa, are due to contraction, the concrete blocks not being thoroughly dry when put into the wall. The brick absorbed no more water than they would hold, and very likely a great deal less, but they absorbed water from the concrete blocks, thus causing contraction cracks to develop. Had the brick been well wet before laying it is likely this would not have happened.

Brick-Veneer and Lap-Siding Construction

From Hee H. See, Sacramento, Cal.—The enclosed sketch may offer some suggestions to "H. R. T.," Mildred, Kansas, whose inquiry under the above heading appeared in the February issue of the paper. I think the sketch explains itself, but I will offer a few words on the method of procedure.

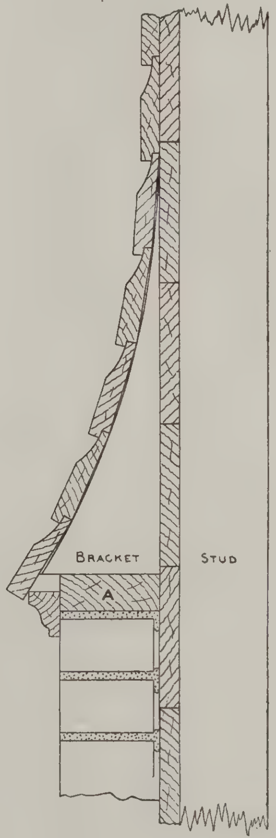
After the brick work has been brought to the correct hight prepare the piece marked "A," cutting it the correct length and laying it in position to prove that it is not too wide at any point. Bed this piece with mortar to make as weatherproof a job as possible; tap it level and bring the front edge even with the face of the brickwork, placing small shims between it and the sheathing if necessary, and then nail firmly in place.

The curved brackets should be cut from $1\frac{1}{2}$ in. or 2 in. material and nail one over each stud. The small molding should then be fitted and nailed in place so as to break the joint between the brickwork and the piece A as shown in the sketch. The siding is then applied in the usual way.

If it is desired to use shingles instead of the siding it will be necessary to place sheathing or shingle lath outside the brackets. In this case the brackets might be nailed directly to the studs and the sheathing put over them. This would save some sheathing and perhaps a little labor, but to run the sheathing straight through will make a more weather-proof job. In some localities the writer would be disposed to use a larger molding than the one shown so as to prevent as much as possible the drip from the siding running down the face of the brickwork.

The length or hight of the curved bracket may be from 18 in. to 2 ft. A good way to decide this matter is to run the top of the curve to the under side of the second story window sills. This gives the "break" in the side of the house a neat and symmetrical appearance.

If it is required that the siding on the upper story come out to the face of the brickwork, one solution of the problem would be to cut off the studs at the first story ceiling line, put on a plate and allow the second story joists to project over them.



Brick-Veneer and Lap-Siding Construction

The second story studs can then be set out to the proper distance so that the siding and brickwork may line up with each other.

Laying Out Sash and Doors

From G. A. W., Louisville, Ky.—In answer to "O.P.," Belle Vernon, Pa., as to the proper way to set inside door jambs I will give him the method which I have used with satisfaction.

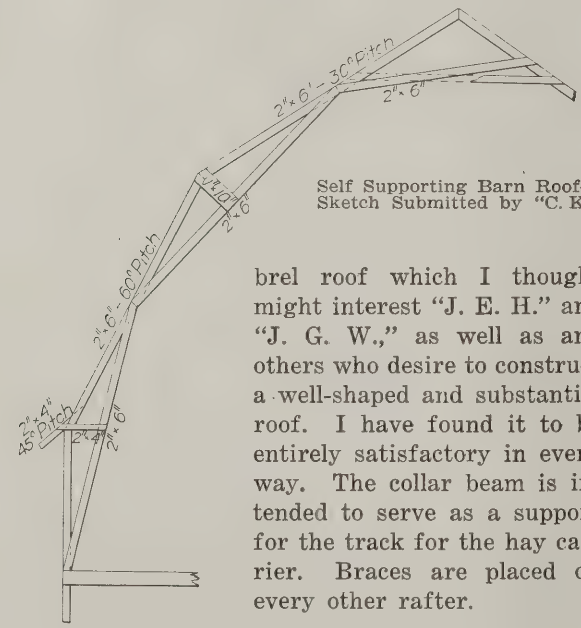
In the first place I have a straight edge 7 ft. long and a level that will level and plumb accurately. Nail the jambs together on a pair of trestles; straighten one edge of a piece of 7-8 x 2 in. stuff and cut this the exact distance between jambs. Measure down the same distance on each side of the jamb and nail 7-8 x 2 in. piece with top edge to this mark. Place the jamb in the opening and see to it that the 7-8 x 2 in. piece is level and then the head piece will be level.

Next take the straight edge and plumb the door jamb on the side the door hinges. See that this side of the jamb is plumb and straight bringing it out with wedges where necessary. Then bring the other side of the jamb out to its proper place and case it up. Always see that the sides of the jamb are plumb and straight and that the head is level. I hope these suggestions may be of some practical assistance to the correspondent in question.

From D. P. B., Redford, N. Y.—Regarding the inquiry of "O. P.," of Belle Vernon, Pa., permit me to say that doors vary so much that no rule can be given as to their laying out—each is a law unto itself. Let the correspondent examine minutely some door he fancies and he will soon discover what to do. If he is young it will pay him to make a plumb rule at least 6 in. long with a plumb bob in the center and plumb his studding on the butt side with wedges or shingles.

Self-Supporting Barn Roof

From C. K., Woonsocket, S. D.—I am enclosing herewith a rough sketch of a self-supporting gambrel roof which I thought might interest "J. E. H." and "J. G. W.," as well as any others who desire to construct a well-shaped and substantial roof. I have found it to be entirely satisfactory in every way. The collar beam is intended to serve as a support for the track for the hay carrier. Braces are placed on every other rafter.



Self Supporting Barn Roof—Sketch Submitted by "C. K."

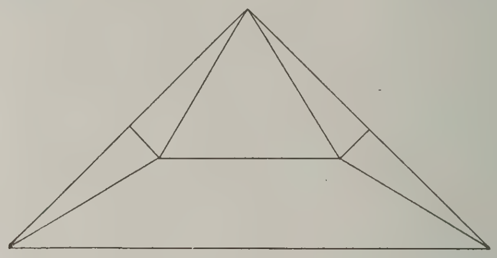
Cause of Cracks in Wire Glass

From W. S., Washington, D. C.—Will someone who has had experience with wire glass explain why it sometimes develops cracks which do not touch either edge of the glass but run through the middle? Some of these cracks are nearly straight, but as many more are irregular in shape, something like a question mark. Is 3/8-in. glass more apt to crack through than 1/4-in. glass?

Some lots of glass will not show a crack in an entire lot. With others, nearly 25 per cent. of the glass will crack, usually near the center of the width of the sheet.

Construction of Church Roof Truss

From Builder, Clinton County, N. Y.—I would say to "C. D. P.," Marble Falls, Texas, whose inquiry appeared on page 53 of the March issue of the paper, that a truss suitable for his purpose is illustrated in Fig. 1 which is drawn to half pitch. It will give a low arch and is especially low for a church. He, however, gives no information of the load on the roof or of what material the roof is to be built; hence I have drawn Fig. 2, which is a modification of this truss, to meet his needs. The roof is 5/8 pitch, the peak being 25 ft. above the plate and the builder may make it steeper or flatter according to preference. The roofing material is 2 x 6 in. stuff.



Construction of Church Roof Truss—Fig. 1—Arrangement Suggested by "Builder"

The rafters must be in one piece. The ends of the tie beams will act as struts. The center *E* is a tension member. If the roof is heavy the members *A*, *D*, *E* and *F* should be well bolted. The member marked *C* laps over a strut. On opposite sides of *E* with a piece in between are the members *A* and *D*. There is no strain on *B*. The member *F* will be doubled between the rafters. Each pair of rafters should be trussed, spiked together, set up and then bolted. The strain on the elevated tie is about doubled when it is elevated half the whole hight and is proportionately increased on the other members.

Snow need not be seriously reckoned with in Texas and the formulae for wind pressure are pretty much all wind and vary as much as the winds themselves. The fact is generally overlooked that the inside of any building is not a vacuum. The frailest glass roofs and walls stand the worst

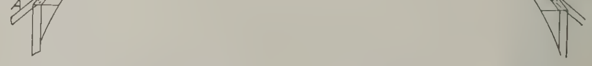


Fig. 2—A Modification of the Truss Shown in Fig. 1

winds; so of ordinary doors and windows. For roofs of 45 degree pitch and more both pressures are assumed to be the same. The load will likely not exceed 20 lb. per horizontal square foot of roof. No reliance can be placed on tests made on 1 in. pieces and then using that value in a piece of timber. The results are often double what is safe.

An Adjustable Door Frame

From H. E. W., Bloomfield, Mo.—As I have seen nothing published in the paper from this section of the country I will improve the opportunity which now offers and see if I can miss the waste basket. I am sending sketches of an adjustable door frame which perhaps may be of benefit to some of my brother chips and if any of them have a better device than mine I should be very glad to see it illustrated and described.

In Fig. 1 of the sketches is shown the door frame ready to be set. It will be noticed that I have a single jamb on the side to which the hinges are applied and a double jamb on the lock side of the door. The inner or false jamb is loose and with the exception of the set screws the casing is nailed to the outer or main jamb, which leaves the false jamb to be adjusted to fit the door. If the door swells and becomes too tight it is only necessary to tighten up the set screws, or if the door shrinks, to loosen up a little on the screws.

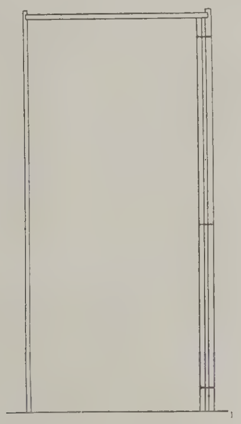


Fig. 1—The Door Frame Ready to Be Set

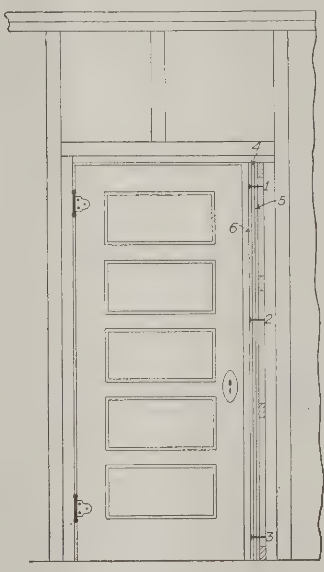


Fig 2

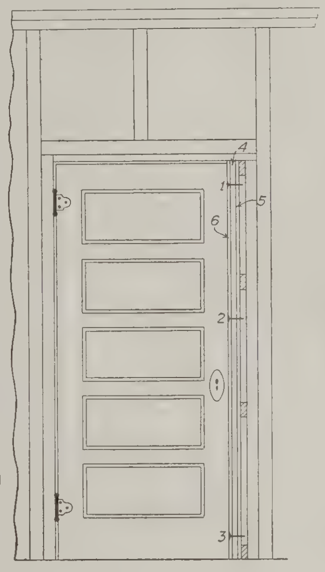


Fig 3

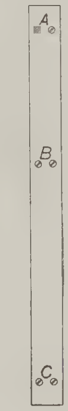


Fig. 4

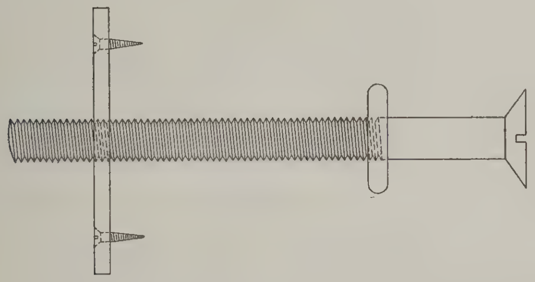


Fig. 5—The Set Screw, Very Nearly Full Size

Fig. 2—The Frame in Place and the Door Hung
Fig. 3—Shows the Space No. 4 Between the Two Jambs After the False Jamb Is Adjusted to the Door
Fig. 4—The False Jamb Showing the Set Screws

An Adjustable Door Frame—Submitted by "H. E. W.," Bloomfield, Mo.

In Fig. 2 is shown the frame set in place and the door hung. All that it is necessary to do is to hinge the door, push it shut, then adjust the frame to the door. There is no fitting to be done. In this sketch 1, 2 and 3 are the set screws; 4 is the space between the false jamb and the door, about 9½ in., before the jamb is adjusted; 5 is the main jamb, and 6 is the stop jamb.

In Fig. 3 the space between the two jambs after the false jamb is adjusted to the door is shown at 4.

Fig. 4 represents the false jamb, and *A*, *B* and *C* are the set screws. Fig. 5 represents a detail of the set screw which is used.

Raising a Flue Top Into Place

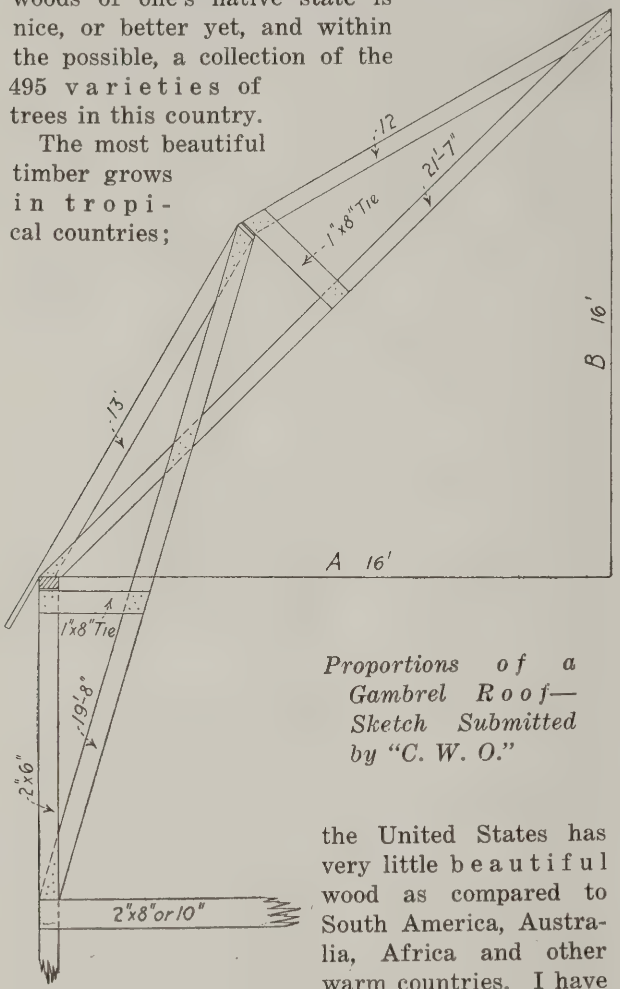
From A. R. E., Kansas City, Mo.—I have a flue top that must be put upon the top of a brick flue which in turn is on top of a very steep church and the top of the flue is 10 ft. above the roof. Can someone suggest a way for me to do this work without building a scaffold? From the top of the chimney to the upper end the flue top after it is finished will measure 15 ft., making 25 ft. in all from the roof to the extreme top.

Details of Inlaid Tables

From E. E. Willard, Huron, S. D.—In the March issue of the paper, "H. L. B.," of Columbia, S. C., asks for ideas and information as to inlaid tables. In reply I would say the field of designs for such work is as unlimited as the varieties of wood with which to do the work, and what appeals to one as unique or dainty does not suit another at all. In work of this kind one has a broad field for original ideas and that with a love for the work tends to bring out the very best one can do. It depends some on what a table is to be used for as to what the design should be; for instance, a card table inlaid with the ace of hearts, spades, clubs and diamonds, one in each corner, is very appropriate, but would hardly do for a library table. I know of a table inlaid with a lodge emblem in the center, and a cross in each corner; another one, a round table, with a star in the center and growing in size till it reaches the edge. I am making a library table 34 in. x 56 in. and the design is more to show up the beauty of the wood than any attempt at designing, still the idea came to me in the "still small hours" of the night.

Unless one is good at inlaying he should confine his work to straight lines mostly; nothing looks quite so badly as a poor job of work when it is plain to see that a fine job was intended. I know of a piece of work of this kind where a map of the United States is inlaid, each state is represented by a native wood. The idea is fine, but who ever saw a square map of the United States, with no coast lines, lake or rivers?

As to the wood to be used, that must be decided by the one doing the work. A collection of the woods of one's native state is nice, or better yet, and within the possible, a collection of the 495 varieties of trees in this country.



Proportions of a Gambrel Roof—Sketch Submitted by "C. W. O."

The most beautiful timber grows in tropical countries; the United States has very little beautiful wood as compared to South America, Australia, Africa and other warm countries. I have collected and worked into my table so far 338 varieties of wood, representing 25 foreign countries, and half of the states here. I have duplicated some varieties three or four times, but were I to do the work again I would use only one piece of a kind as it adds value and interest.

Pieces of wood from historical places and things make a very interesting and educational table top, especially if it is to be used for study. A design in harmony with the material used should be carried out.

It is sometimes impossible to carry out a fixed design and use all the kinds of wood that one gets, because some pieces you get will be very small, perhaps begged from a friend, so I found that a little "crazy patchwork" in the shape of a diamond was a good place to use pieces too small to be used otherwise and makes a very pretty as well as odd figure.

One thing more, and above all the most important, have the wood *dry;* not dried in a coal house or barn, nor by laying around the house a week or so, but dry it on the stove, in the oven or on the furnace, but be mighty sure that it is *dry,* if you don't you will have a long time to regret it when you admire your handiwork and show it to your friends. There is a way of drying by electricity, but I am not familiar with it.

The finishing and polishing is another story; if you have not started your table yet, you won't need to worry about that for some time.

Proportions of Gambrel Roof

From C. W. O., Winnebago, Minn.—My view of a gambrel roof of good proportion and one easy of construction is represented in the sketch submitted herewith, this showing half the bent. I have taken for illustration a barn 32 ft. wide with rise equal to half the run. The straight rafter is a part of the truss which supports the plate as well as the roof. Take a triangle of 60 in., place the right angle on the plate line "A" and draw the bottom rafter; then reverse the triangle, placing the right angle on the perpendicular line "B." Draw from top of rafter on the 60 in. side until the two lines intersect, which will give the gambrel line.

I use the trusses 8 ft. or 10 ft. apart, according to the length of the barn, and with a purlin in the gambrel joint the same size as the rafter.

Repairs for a Concrete Roof

From Ernest McCullough, Chicago, Ill.—Replying to the query of "T. A.," Lancaster, Pa., on page 51 of the June issue of the paper, I would suggest that the correspondent clean the roof with water, washing out the small cracks as well as he possibly can, then fill the cracks with a mixture of silicate of soda (commercial solution) and a saturated solution of alum, equal parts. After the cracks have been filled, mop on the asphalt as proposed. Unless the cracks are first filled the asphalt may not fill them and when it is hard it will be apt to crack where the cracks occur in the concrete.

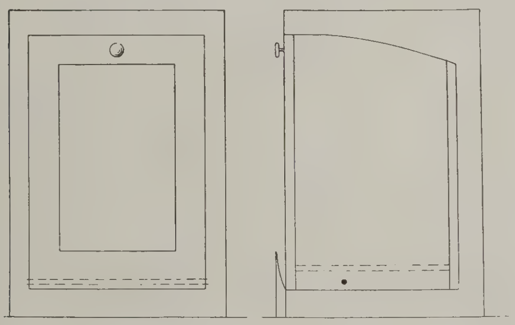
Comments on Various Questions

From H. B., West Pittston, Pa.—I notice that in connection with most of the house designs published in the paper there is lacking any reference to the cost of labor or detailed cost of the various parts of the work, such, for example, as the cost of plastering per yard, etc. The other day I figured one of the plans which were published and according to my computation it summed up to 95 cents per yard. In the May number of the paper I figured one of the designs at about 50 cents per yard. Now, it is well known that it is difficult for any practical man to give a figure for work that is satisfactory in any two counties let alone different States, but I thought that the writers might have stated the price on a house if they really desired to give the readers information. I am plastering now for 40 cents per yard with wages at $4.40 and helper $2.40.

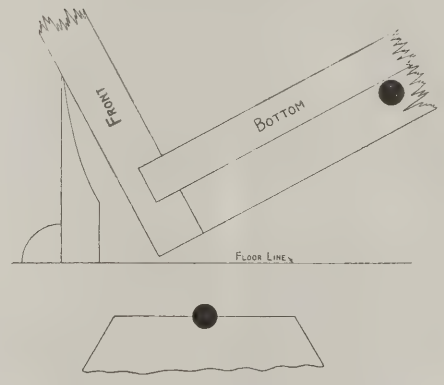
If a man wants to help the younger element why does he not do so; not "spout out" of their love for the apprentice and give misleading information because they are afraid the apprentice will outshine them. I may be pardoned if I say that I have been for 27 years a contractor in all branches of masonry with lots of work and I obtained most of my figures from actual measurement of walls, because the older brothers would not give me correct information. One man even tried to tell me that there were 400 degrees in a circle and tried to prove it by saying that Dr. Cook went 96 of them.

One brother, "H. L. M.," of Pawling, N. Y., wishes to know how to make waterproof a cellar that was laid up dry. He says the inside was painted and that he cannot get at the outside of the walls. He cannot plaster on paint so I guess he will have to fix it somehow so as to make it stick on the inside. Driving nails in a wall would be all right, but oh! what a job it would be. In my opinion he has something of a problem on his hands.

A good mixture consists of a 2:1 cement mortar and 20 per cent. hydrated lime. This reminds me that I had a funny job myself some time ago. An ice cream dealer wanted a tank to hold water in which to set milk cans. Three sides were concrete and the fourth side was the stone foundation wall of the adjoining house. I plastered the interior with 2:1 cement and 20 per cent. hydrated lime and it does not even sweat through.



Front and Side Elevations of Floor Bin



Details of Lower Corner of Bin

Details of a Flour Bin—Sketches Submitted by "J. S.," of Morrisonville, Iowa

If we could have once in a while a little on ornamental brick work or the fancy bonds of brick work it might be the means of waking up the bricklayers.

Criticism of Barn Framing

From Builder, Clinton County, N. Y.—Referring to the barn bents appearing on page 62 of the April issue and concerning which the correspondent invites criticism I would say that the first method of "F. W. & S." is a good one. The 2 x 8's double are superfluous in the roof.

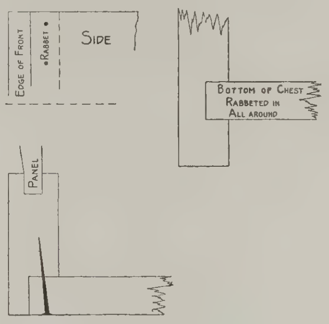
The second method presented is complicated and weaker at the roof than the other.

Details of a Flour Bin

From J. S., Morrisonville, Iowa.—In reply to the query of "O. R. H.," Sedalia, Alta., asking for details of a flour bin, I am sending sketches which I trust may be of interest to him. The bin, as will be seen, is made to balance on a ½-in. iron rod and will hold over 100 lb.

In doing the work the correspondent should make the front the same as a panel door, with mortise and tenon, using 1 1/16-in. boards for the purpose. The panel should be 13/16 in. For the sides use 13/16 x 14-in. boards. The back should be 16⅜ in. wide. The front is rabbeted to receive the sides, which are nailed on. The bottom is rabbeted in all around. The sides are also nailed to the back.

The ½-in. rod is placed as shown in the details, 6 in. from the front and 3⅝ in. from the floor line. Its position is clearly indicated in the detail which represents the lower corner of the chest.



Various Details of Construction

If I have room I let the iron rod rest on 2 x 4-in. blocks placed on the floor as indicated just below the detail representing the corner of the chest. I think the sketches will make everything clear to the correspondent asking the question.

Construction of Cobblestone Chimneys and Foundations

From C. A. L., Monroe City, Mo.—As a subscriber to *The Building Age* I would like to ask interested readers to tell me the most practical way to use small boulders or cobblestones in foundations and chimneys.

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One of the laws recently passed by the legislature of the Commonwealth of Massachusetts provides that inspectors of masonry construction on all jobs by the state, metropolitan boards, counties, cities and towns must have had at least three years practical experience in masonry construction.

Chimneys Ornamented with Tile Work

An English Architect Offers Some Suggestions for Rendering Chimneys More Decorative in Their Appearance

SOME very timely comments on the decorative effects which may be given to chimneys of buildings by the judicious use of tile are contributed by W. G. Kerby, an English architect, to a recent issue of one of the London building papers. We present extracts herewith for the interest which they may possess for American readers.

Considering the prominence of the chimney as a striking architectural feature, it is rather a wonder that there is comparatively so little endeavor made to render it even presentable on the majority of buildings. Even with the simplest cottage work, it is possible to transform it into quite a decorative feature, by very inexpensive methods if only a little thorough consideration is given to it. The large-size tiles—those measuring 10½ in. x 6½ in.—are also of such a character that a good projection can be given a few oversailing courses in the formation of the most simple cornices, which possess a large amount of architectural effect, as for instance, something after the nature of Figs. 3 and 8. For very plain work, however, a few simple, projecting courses of tiles, may be introduced—one used singly as a fillet course, with two or three rows over. A similar blocking course with a single tile set on the angles, surmounted with slayed cement or roughcast, such as shown in Fig. 1, forms a pleasing variation from so much plain brick oversailing work. Simple tile work is no more costly than brick; at the same time it has not the coarse or heavy character of the latter. Being of a far finer nature, it is thus more particularly adaptable to roughcast work than the former, which usually affords a too violent contrast, unless carefully combined with tilework, to break its harsher effect.

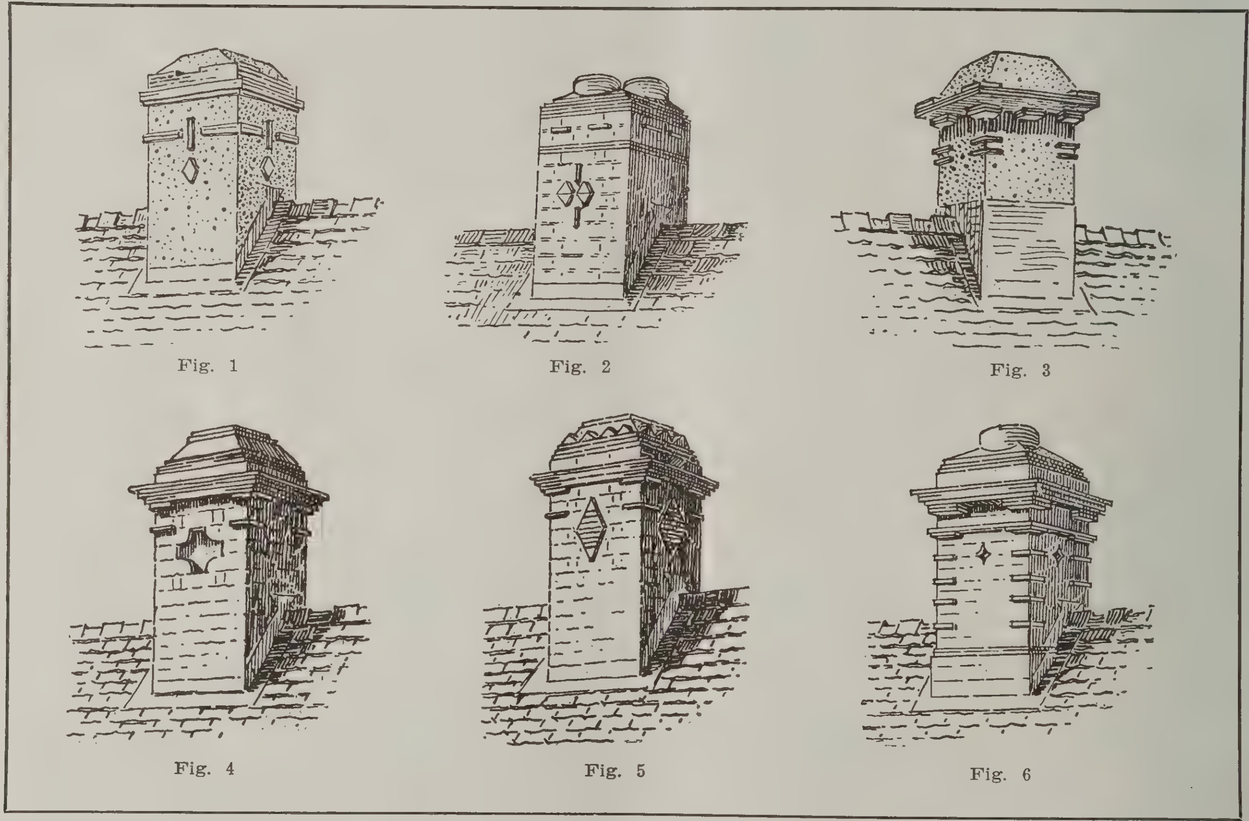
Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Chimneys Ornamented with Tile Work—Showing Some of the Effects That May Be Produced

The narrow relief of the tile, worked mainly on a flush-face style, in brickwork, also affords another system of slight relief in a plain manner, particularly when the brighter red of the tile is contrasted with brown, stock, or buff bricks, as in Fig. 2. The slightest of brick relief is also introduced, in combination, at the centre of these two stacks, merely composed of pointed coping-bricks of shallow projection. The brick angles to these can be easily taken up with the ready-made chamfer-bricks, so that no special cutting need be involved here. The bolder projection given by the slight tile cornice—illustrated in Fig. 3, with its course of double-tile dentils and angle-necking, forms a very simple, but nevertheless effective, chimney-stack, well suited for work of a rustic or suburban character.

Fig. 4 illustrates something more approaching the customary type of moulded top, in general effect. A few courses of tiles so disposed, in a combination of single, double and treble rows, etc., possess all the effect of an elaborately moulded cornice-piece when seen from the ground or a distance—the position from which such are mainly viewed. The sunk-brick relief panel in this figure is simply formed with the bull-nosed brick, filled with pointed copings and cement, which can be colored, if desired, to match the brickwork.

The latter decoration can be replaced with tiles set to many designs, in a finer system of ornamentation, such as the diamond pattern illustrated in Fig. 5. The points to the diamond are started with pointed coping-bricks, to eliminate fine cutting, which would occur with tile-ends. The course of pointed coping-bricks to the top also affords further enrichment, although quite simple in construction. The splayed coping of cement over it being again surmounted by a single-tile course, as ducing tile diamonds, as in Fig. 5, or different made-up tile patterns.

Although these all represent distinct variations, quite different from the majority of such work in vogue, it is quite possible to produce many other types on more original lines still, after the character illustrated in Fig. 8. The broad, projecting cornice member, as previously mentioned, is one which is particularly effective and well worthy of special note. The shallow, canted angles, treated at the top with a few projecting tiles on edge, forming brackets. They afford quite a large amount of variation, which is thus attained in the most simple manner. A panel composed of long and short tiles, with pointed bricks in the angles, is introduced on the front and sides, with a drop-piece in a brick or projecting base of the same material. The top is finished with a fine coating of cement. If preferred the tile brackets could be sloped off at an angle, which would prove more effective, well worth the seen. Fig. 6 is also based mainly on the ordinary conventional lines, but still affords a somewhat more picturesque appearance, merely by the introduction of single-tile quoins of slight projection.

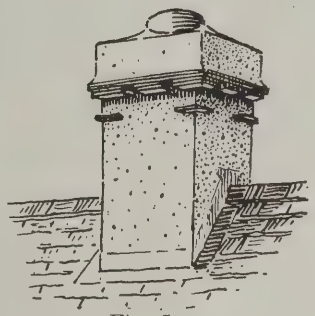
Fig. 7

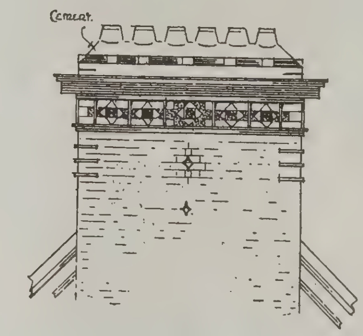

Fig. 9

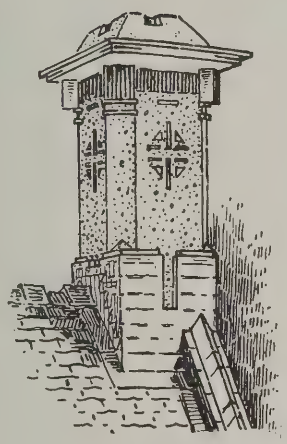
Fig. 8

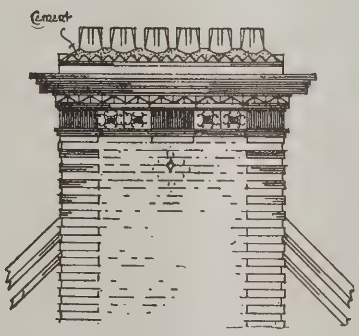

Fig. 10

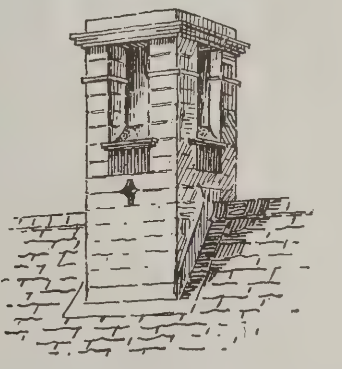
Fig. 11

Chimneys Ornamented with Tile Work—Showing Some of the Effects That May Be Produced

A more picturesque and original appearance is given in Fig. 7, although there is far less work in its construction. It is merely composed by a slightly projecting, heavy blocking course on a double-tile band, the latter being further supported on two or three double-tile dentil-blocks. A slight necking course is also merely suggested by the insertion of single tiles on the angles. The latter could be carried across, if preferred, and a course of tile quoins inserted, as in the preceding example, to form another variation. Others might be formed by introlittle cutting and rubbing involved. This sketch merely illustrates to a slight extent the possibility of a great deal of work on somewhat similar lines; work which might all be made equally as original, varied, and distinctive in character, if given a little study of the application of the tile in its ornamental capacity. Such work, as shown by the two latter figures particularly, might very well be arranged in concrete construction.

A different method of frieze treatment, as applied to the chimney-stack, is illustrated in Fig. 9. It is here broken up into smaller panels by slightly projecting vertical tiles. A central band of white, buff or other tinted roughcast—of rather a fine character—forms a middle line to the frieze itself.

The centre of each panel is formed with a patterned tile, placed flat, with pointed bricks arranged round it. The top and bottom courses adjoining these are formed with the ready-made chamfer-brick to avoid cutting. A little color relief may be introduced here with good effect, by using subdued tones of glazed tilework in place of the central-patterned ones, to the small panels.

A more elaborate finish to a large stack, somewhat similar, is seen in Fig. 10, broad tile quoin-blocks to the depth of a course of brickwork, being used. Broad triglyphs to the frieze are formed with alternately projected tiles on edge. The intermediate panels could either be patterned or in color, as suggested for the former example. The dentil course over is formed with pointed bricks, the under ones being slightly recessed. It should be noted with this class of ornament, as applied in the two latter instances, how far more refined it is than brick relief alone. Used in conjunction with brick, it is really possible to execute work of practically equal refinement to some of the best classic examples, although in quite a different style of ornament.

An Interesting Example

A chapter on this section would hardly be complete without calling attention to the particular qualities of Fig. 11. Although based on an old-fashioned principle, it is, nevertheless, an extremely good one, which it is a pity not to see in more general use. The flat top prevents both wind and rain from driving directly down from various angles. The angle-blocks themselves also deflect these forces considerably from various other angles. The smoke, in consequence, is drawn out of one or the other of these openings even during very high winds. As a smoke-preventer it has long been recognized in many localities of a bleak and open character, where the full force of heavy gales are felt. Its simple, but picturesque, qualities are a further recommendation, particularly in lieu of the majority of chimney-pots, which are often of a reverse nature.

It is quite apparent that the chimney-stack, while forming a really important feature—one of the most striking and pronounced on any building when really studied from the point of architectural design, is too often ill-considered. Even on buildings which show a great deal of study and thought in the main design or general composition it is more often evidently considered that anything will do for the chimney-stacks; any old stock-patterned type. No matter whether they happen to suit the particular structure or not. That this is a great mistake, quite spoiling any genuine continuity of design throughout, which should be the chief endeavor for really satisfactory work, anyone can easily discern for himself by looking around in his own vicinity.

A badly designed or unsatisfactory stack forms one of the strongest conflicting notes possible on any structure, from a genuine architectural point of view. It should, therefore, be given quite as much study and consideration as the lavishly decorated façade, porch, or any other individual feature which goes to make up the whole. Even if it occasionally happens to come in an awkward position for treatment, it will still be found that, with proper attention, it can be made an equally as decorative and ornamental feature as any other upon the building.

Tenement House Construction in New Jersey

According to its last report the Tenement House Commission of New Jersey supervised the construction of 10,103 flat houses with a total estimated cost of $95,734,000, in the period from the enactment of the Tenement House law on March 25, 1904, to the date of the report in question. These new flat houses furnish accommodations for 63,000 families, or 315,000 persons.

Builders in New Jersey spent $13,013,000 last year in the erection of new law tenement houses, a sum greater by $990,000 than the previous highest amount ever invested in one year in buildings of this class.

The previous high record was that of 1907, when $12,023,000 were expended. In the old tenement houses erected before the enactment of the law the larger number of interior rooms were without direct light of any kind. The only attempt in the old-style tenement houses to light the inner rooms was by means of a V-shaped shaft containing an average of 10 sq. ft. As a rule this small shaft was covered at the top with a small skylight, but usually without any means of ventilation. In the new law tenement houses every inner court and every vent shaft is connected at the bottom with an air duct leading to the street or yard and is open at the top, thus insuring a circulation of air through the shaft.

The Three-Story Tenement Popular

The three-story frame tenement house still retains its popularity with builders and owners, the records showing that practically 64 per cent. of all the tenement houses erected in the year or in course of construction at the time of the last report were of this class. These buildings are arranged for one or two families on a floor and not more than six families in any building, as the law limits the occupancy of a frame tenement house to six families. As a rule the apartments in these three-story frame buildings consist of five rooms and bath, in many instances equipped with heating plants. The buildings are usually constructed on a lot 25 x 100 ft., one side of the house being on the lot line with a street to yard court or passage 3 ft. wide at the other side. The side of the house on the lot line is brick filled; that is, the space between the studs is filled with brick laid in cement mortar. The interior rooms on that side of the building, if any, are lighted from an interior court 4 x 10 ft., while the rooms on the other side of the building obtain their light from the 3-ft. street to the court yard.

Next in favor with the builders and owners is the three-story brick building, of which 277 or 17¾ per cent. of the total were erected in the year. Next in point of popularity is the four-story brick building arranged for one or two families and occasionally for three families on a floor. There were 170 of these buildings erected, representing 10.9 per cent. of the total. There were 50 two-story frame tenement houses, 37 two-story brick tenement houses and 28 five-story brick tenements erected last year.

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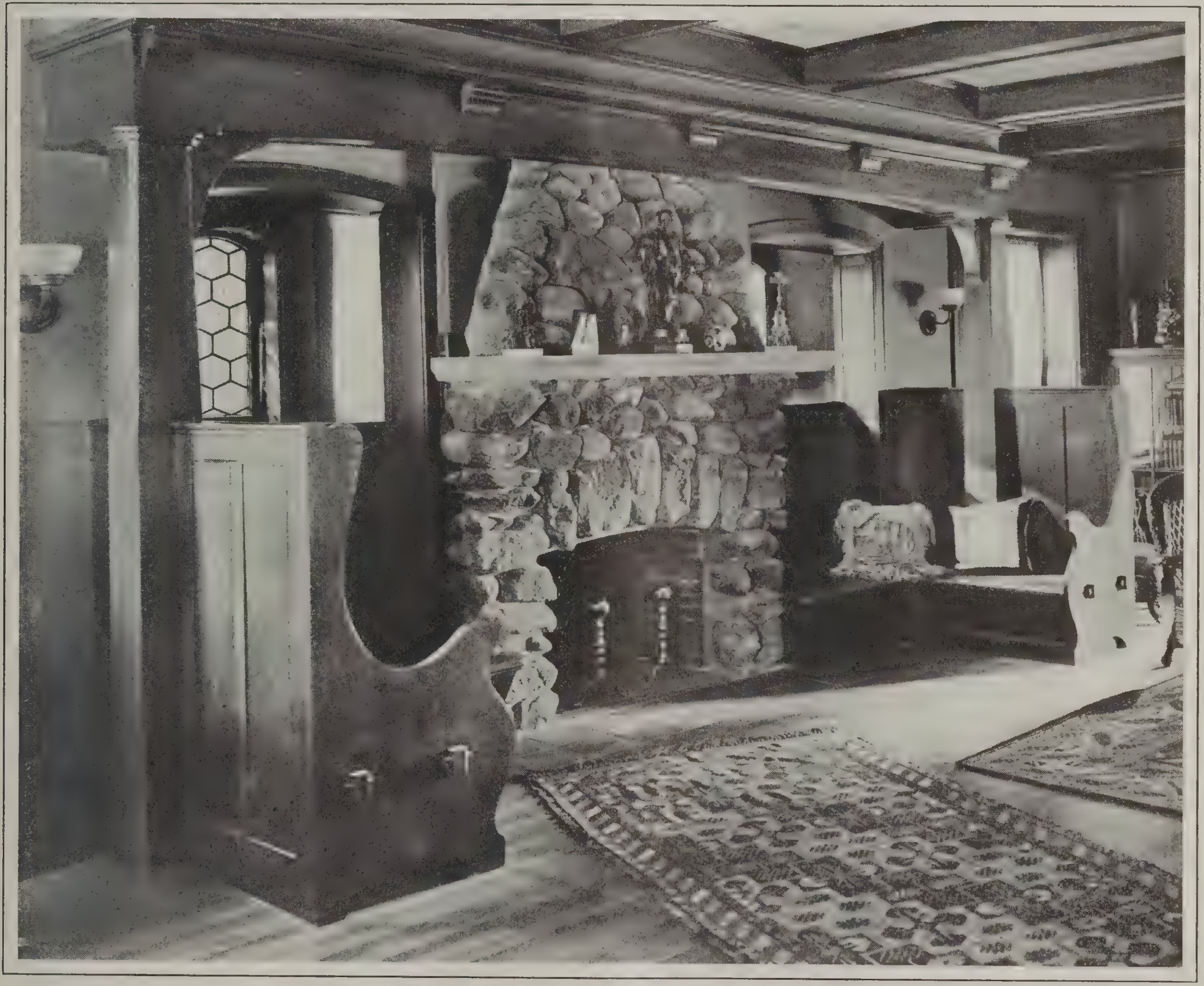
The question of licensing architects in Queensland, Australia, is being vigorously agitated.

The Fireplace in the Modern Home

Engineering Skill Has Replaced the Ancient Chimney Opening with an Appliance Which Will Not Smoke

THE fireplace was once an absolute necessity because of the fact that there was no other means of warming a dwelling, but after the introduction of the modern heating appliances it became a luxury. Now the modern improved fireplace has again become a necessity to the man who can afford it. Its many advantages as a supplementary heater are so fully recognized that few persons fail to include one or two fireplaces in the design of a residence. To the man who recognizes the difference between the house and the home, the spirit of hospitality and comfort radiated from an open fireplace as pictured in Fig. 1, for example, is an indispensable adjunct.

Until the advent of the modern fireplace the use of such a heating source involved many annoyances, and in spite of the fact that the well designed equipment of the present day eliminates almost all of these features, the impression still prevails in the minds of many that while the cheerful open fire is an attractive addition to the home, its enjoyment must be accompanied by a smoky atmosphere, an enormous fuel bill, a light deposit of soot and ashes over the delicate fabric of the library furniture and an uneven temperature in various parts of the room. There are still fireplaces in which the smoke comes into the room and much of the heat goes up the chimney, but they are those to the design of which well known engineering principles have not been applied.



The Fireplace in the Modern Home—Fig. 1—The Inglenook Becomes the Centre of the Home Life

He who plans to install a fireplace in his home sholud make certain that the initial design is a good one, for the fireplace and its chimney will become an integral part of the structure itself, and any considerable change in the form of either will involve a bill of expense which will make the average man wince.

In the construction of a fireplace the most important point is that portion located just over the fire and known as the "head" or "throat." Probably one-fourth of the trouble experienced with smoky fireplaces results from a poor construction at this point. The Colonial improved fireplace head, manufactured by the Colonial Fireplace Company, of Chicago, Ill., is one of the many on the market which are designed to offer a solution of the smoky fireplace problem. This device, illustrated in Figs. 2, 3 and 4, makes it possible to control the draft in the fireplace in the same manner as is accomplished in the kitchen range. The appliance is designed to make possible the control of the draft irrespective of the weather conditions prevailing on the outside of the house. One of the advantages of this type of equipment is that the fireplace can be instantly closed when it is desired to discontinue its use for a season. The various adjustments are easily accomplished, and the use of this equipment simplifies the erection of a fireplace.

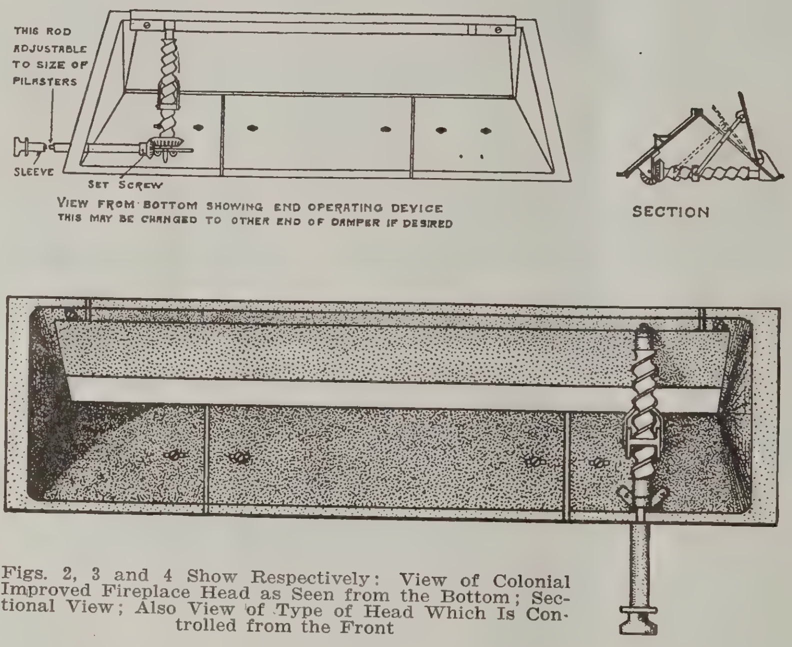
The improved Colonial head is cast in sections, which are reinforced with steel angles. The No. 00 and No. 0 may be used to carry face brick across the opening wthout angles, and these are the only sizes made in one piece. The throat is so constructed as to allow for expansion and contraction.

With the use of such a device as that illustrated, mistakes in construction on the part of masons are avoided. When backing up with common brick, the steel angle or ledge prevents the backing from settling down and pushing the face outward, which is a very important feature. The damper is so constructed as to operate from the outside of the fireplace. Style A, which is the regular pattern, is operated from the face of the fireplace on the left hand side. In Style B, illustrated in Fig. 5, the operating device comes out just below the arch bar of the fireplace on the same side as Style A. It may also be had with the key in the center, which is very convenient when arching fireplace openings are used. An iron wrench for turning the key is sent with this style on request. Style C is made with the key projecting through at the right hand end. This style is much used where marble or stone facings are employed on fireplaces, or where the key is not wanted on the front of the fireplace. The device is also furnished with an old-fashioned ratchet damper opening from underneath. The drop collar carrying the operating rod regulates the hight of style B.

Fig. 6 gives a sectional view of the Concord grate, made by Edwin A. Jackson & Bro., of New York City. The picture shows the manner of constructing the fresh-air duct when the fireplace is situated in an interior wall of a house. The Concord grate here illustrated is designed for heating only on one floor, while the Oliver, made by the same company, provides for the heating of rooms on different floors. In the case of the Concord grate pure air is taken from outside through an opening in the base and distributed to spaces directly back of and on the sides of the fire. From these the air enters the chamber at the top through which the smoke flues pass. A current of pure warm air passes directly into the rooms through the openings in the frieze of the grate.

The chambers into which the heating space is divided are separated from the fire by a cast-iron back which is made seamless to prevent the leaking of coal gas into the room. Surrounded as it is by air chambers there is no danger of overheating and therefore no danger of the burning out of the grate. If the basement of the building or dwelling is clean, air may be taken from this, but it is usually preferable to take the air suply from the exterior of the structure. With a register in the ceiling of the room which contains the grate and a register in the floor of the room above, these two rooms can be heated from the same fireplace. This style of grate can be arranged to drop ashes to the ashpit if desired.

In the case of the Oliver grate previously mentioned, two rooms on the floor above may be heated if they are not unusually large. The volume of air entering is equal to over 180 cu. ft. per minute.


THIS ROD ADJUSTABLE TO SIZE OF PILASTERS
SLEEVE
SET SCREW
VIEW FROM BOTTOM SHOWING END OPERATING DEVICE
THIS MAY BE CHANGED TO OTHER END OF DAMPER IF DESIRED
SECTION

Figs. 2, 3 and 4 Show Respectively: View of Colonial Improved Fireplace Head as Seen from the Bottom; Sectional View; Also View of Type of Head Which Is Controlled from the Front

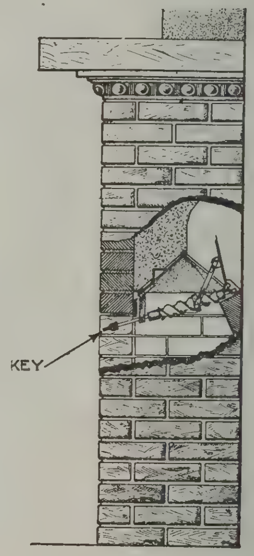
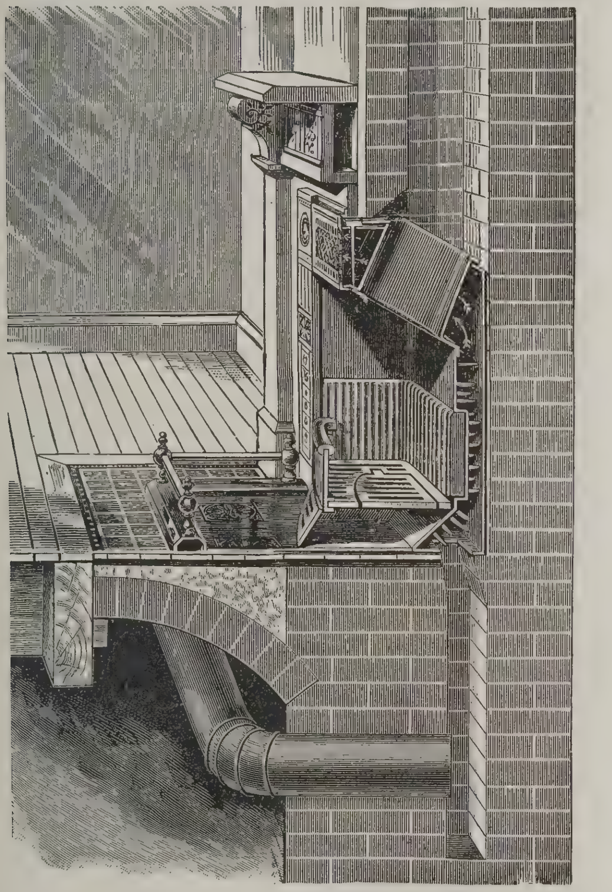


Fig. 5—Sectional View Showing Style B

The Fireplace in the Modern Home—Various Details of the Colonial Fireplace Head

This, together with the radiation from the No. 3 size, will heat about 7,000 cu. ft. of space, assuming the average exposure. A valve is provided for the regulation of the cold-air supply and also a valve over the top to regulate the drafts.

In the case of the Oliver form of ventilating grate, air entering at the cold-air inlet is heated as it passes over the back and enters the room through the register in the front of the grate, or it may be so adjusted as to pass all of the heat to the room on the floor above. It is best to have the inlet from the north or west, even though this necessitates the running of a 6-in. pipe across the cellar. The exterior openings should be 18 in. or more below the floor level and the pipes should be slanted upwards until the chimney is reached.



The Fireplace in the Modern Home—Fig. 6—Sectional View of Concord Grate

If the rooms are not large, the Oliver grate can be set with registers to heat the two rooms above and also to heat the room in the rear of the one in which the fireplace is located.

When the grate is located on the first floor, it will be found convenient to have an ashpit. The company which makes the Concord grate also has designed the improved Jackson ash trap, which is intended to prevent the upward escape into the room of dust and ashes often experienced when the fire is raked. In the case of this ash trap, ashes collect in the trap itself and when the bottom is swung back, the ashes fall to the pit, but the dust is prevented from flying into the room. This trap maye be used in any open fireplace having an ashpit and for this case a border is supplied for holding the trap in the hearth. The plate over the top forms a smooth surface for andirons.

Another equipment manufactured by Edwin A. Jackson & Bro. applies the general principle of the Jackson ventilating grate but does not have the same heating power because there is not so great a heating surface in the warming chambers. There are ribs across the back and sides to get much more heat than is possible with plain iron linings and a great amount of heat is secured from the bottom plate and from the throat. The air is taken in from the outside as with the other grates, and when warmed passes to the room above or to the back room or to the room containing the grate by means of a register over or at the end of the mantel. When desired this grate can be built in so that there will be no metal work around the front and the effect will be the same as in the old-fashioned fireplaces.

Splayed jambs and a sloping back tend to throw the heat out into the room. The sloping back produces a narrow throat and furnishes a wind break or shelf back of it, which is the best device for stopping a down draft. No fireplace should be less than 15 in. in depth and 20 in. is better. For very large fireplaces, 24 in. is not too deep, but more than this is regarded as unnecessary. The openings should not be more than 2 ft. 6 in. in hight excepting in the place of very wide fireplaces. The throat should be provided with a damper or valve by means of which to shut off the downdraft and control ventilation.

The Covert iron throat and damper made by the H. W. Covert Co., New York City, has been designed to meet these conditions. This damper, shown in Fig. 7, forms a strong lintel to support the masonry of the chimney above. It presents smooth surfaces at an easy angle to lead the gases into the smoke chamber, affords protection to the woodwork in the mantel, provides a damper or valve to control the draft and ventilation, and simplifies the construction of the fireplace to a great degree.

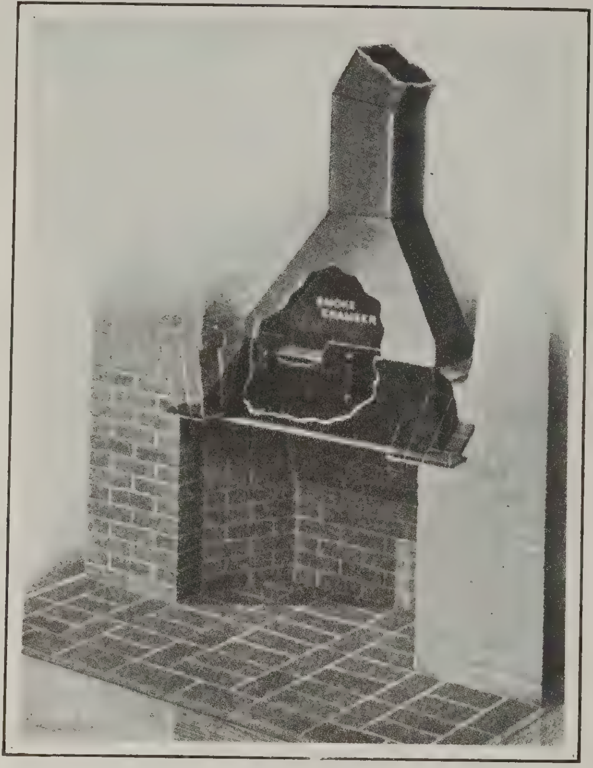
When a fire is burning in a fireplace the heated air, flames and smoke follow the sloping line of the back, gaining velocity until they pass the narrow contracted throat. The forward slope of the back carries these gases to the front of the smoke chamber and any downward or reverse current is forced to the rear of the smoke chamber where it strikes the wind shelf and is turned and carried up again.

In the case of the Covert damper, the ribbed flange, together with the curved front, form an iron beam or lintel of considerable strength. This front flange has a slight camber in order to secure correct architectural effect where a flat arch is used.

The front of the damper is shaped in a curve to conform as nearly as possible with the path followed by the air which runs in under the arch.

The valve rests loosely in a shallow groove cast in the bottom rear flange of the frame. It is held in this position by its own weight and gives perfect control of the draft, as it can be fixed at any point which gives the best result. When open the valve continues the sloping line of the back of the fireplace, making the true throat at the top of the valve plate. This valve can be readily removed from below by simply lifting it out of the groove in which it rests in case it is desired to get at the smoke shelf or any point above the throat.

The operating device is a curved rod, riveted to the center of the valve plate and passing through a slot in a lug to a point underneath the front flange of the frame in the center of the fireplace, a convenient point from which to operate the damper, as it is practically out of sight and yet perfectly accessible. The ratchet on the lower edge of this rod holds the damper in the desired position.



The Fireplace in the Modern Home. Fig. 7—The Covert Damper and Smoke Chamber

A glance at Fig. 7 will show the Covert smoke chamber made by the same company to be placed above the Covert damper, to connect the latter with the tile flue lining. This smoke chamber is intended to be built into the chimney directly above the iron throat. The walls of the smoke chamber are about 1⅛ in. in thickness and are of a strong mixture of Portland cement and sand, reinforced with wire mesh. The hight varies with the width of the fireplace and size of the flue.

For use in connection with the Covert damper is the Climax ash trap, which consists of a rectangular box, the bottom of which fits obliquely and is adjusted by a pivoted hinge. The top is set flush with the hearth, and the box or body of the trap sets down inside the pit. When ashes accumulate the door in the top is opened by pressing with the poker and the ashes drop into the trap, but, as the lower door is closed there is no draft from the ashpit, and no dust is blown into the room. The upper door is now closed, and by lifting the projection with the poker, the bottom is withdrawn from under the ashes so that all the dirt falls into the pit instantly. These traps are also desirable for use under a kitchen range, as well as for other stoves and fireplaces.

Not all makers of fireplaces agree that the air should be taken from the outside of the house. Some argue that it is just as well to take the air from the room, "cook the impurities out of it" and return it to the room

With this idea in mind, the Rathbone Fireplace Manufacturing Co., Grand Rapids, Mich., has designed the Aldine return draft open fireplace, a sectional view of which is given in Fig. 8. It will be seen that the fire pot, flues and ash pan are encased in an iron jacket, forming an air chamber. When the fire pot A and the flues B become heated before the radiating surface of 30 sq. ft., over which the cold air entering openings at either side of the base at E is passed, heated and thrown into the room through register F, keeping up a constant circulation.

In starting the fire in the Aldine fireplace, the damper is opened and the blower put on until the flame comes up freely through the fuel, when it is removed and the damper is closed. When the damper is open the products of combustion pass directly up into the smoke pipe, as in the ordinary direct draft grate, but if closed the hot smoke and gases impart their heat to the iron surfaces over which they travel. This heat in turn creates a draft which draws the cold air from the floor, the air passes over the heated surface, is heated and passes back into the room.

Fig. 9 shows the elevation and section of a concrete fireplace and chimney. The drawings here presented were made by the engineering department of the Universal Portland Cement Co., Chicago, Ill., and were based on the design of a fireplace in the home of W. J. Hatt at Leland, Mich.

The reinforcement consists of ¼-in. rods spaced 9 in. center to center for a hight of 12 in. and then spaced 12 in. center to center for the remaining 12 in. The vertical reinforcement consists of ¼-in. rods spaced 12 in. center to center. One ¼-in. rod is placed in each corner of the chimney. All reinforcing rods are 1½ in. from the surface of the concrete. The shape of the smoke shelf is well shown in the sectional view. Note that the smooth surface of the smoke shelf tends to project the heat into the room, while at the same time a sufficiently wide opening is left through which to draw the smoke into the chimney.

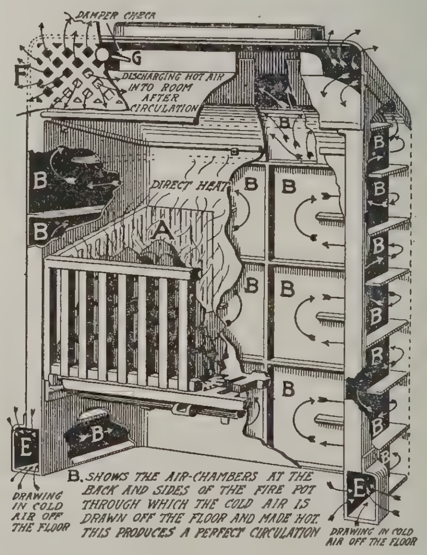

DAMPER CHECK
F
G
DISCHARGING HOT AIR INTO ROOM AFTER CIRCULATION
DIRECT HEAT
A
B
E
B. SHOWS THE AIR-CHAMBERS AT THE BACK AND SIDES OF THE FIRE POT THROUGH WHICH THE COLD AIR IS DRAWN OFF THE FLOOR AND MADE HOT. THIS PRODUCES A PERFECT CIRCULATION
DRAWING IN COLD AIR OFF THE FLOOR
DRAWING IN COLD AIR OFF THE FLOOR

Fig 8—The Aldine Return Draft Open Fireplace

Fig. 10 which is reproduced from a cut which appeared in *Country Life in America* recently, shows how an old fireplace may be fitted with a substantial smoke shelf of concrete. In the old days when fuel was cheap and engineering principles were not applied to the design of fireplaces the average fireplace was built with a perpendicular wall at the back, and the consequence was that a large portion of the heat intended for the room passed up the chimney. In the case of such a construction, the illustration shows that it is a comparatively easy matter to remedy to a great extent the faulty design. It will be noted that the fireplace has been cut away in front and a portion of the upper section has been filled with concrete, producing a design which will tend to throw the heat into the room and take the smoke up the chimney.

Tile is one of the oldest and most satisfactory materials for fireplace construction and that some very beautiful effects in decorative art may be obtained with this material is shown in many examples of the various products of the Rookwood Pottery Co., Cincinnati, Ohio, which manufactures Faience mantels and tiles for the permanent decoration of residences and other buildings. This tile with its mat glazed surface and variety of colors presents a field for the unlimited use of tiles which harmonize with interior woodwork and the textiles used in interior decoration. The variety of colors also enable the decorator to carry the tones and qualities of his general color scheme in any portion of the interior.

The constant application of artistic effort and engineering knowledge for the past 15 years has enabled the Standard Mantel & Specialty Co., Knoxville, Tenn., to produce a line of equipment of this character which is well worthy of investigation. These mantels are made in oak or imitation mahogany and some are provided with French beveled plate mirrors. The fireplace itself is enclosed with vitreous tile and the variety of designs permit the householder or architect to fill almost any requirement in interior design.

A similar line of goods is carried by the firm of Moormann & Otten, Cincinnati, Ohio. Its large variety of mantels, grates and tilings permits great latitude of selection on the part of the prospective purchaser, both as to price and as to architectural effect desired. Many of the designs carried by this company have been modeled to fit special requirements with the idea that architects and others may be able to find the exact style required without a special design.

Fireplaces in tile, wood, brick and other materials are furnished in great variety by Charles F. Lorenzen & Co., of Chicago, Ill. Reference should also be made to the great variety of mantel outfits, etc., supplied by W. H. Ostendorf, of Philadelphia, Pa.

An example of the manner in which concrete can be employed to produce artistic effects in the construction of fireplaces is well shown in Fig. 11, which illustrates a fireplace on the south porch of the New Jersey residence of Albert Moyer, a well known writer on cement concrete work. The surface decoration is worked out in colored clay with special facing in which Universal Portland cement was used as the binding material. For producing the effect shown, the most satisfactory concrete surface of a given color and texture is obtained by properly finishing a surface faced with a mixture composed of cement and an aggregate of the proper size and color. Such a surface may be considered as permanent, will not deteriorate, scale, fade or require renewing. When aggregates of the required color are not available, or for any reason it is not possible to obtain a surface of the desired color in this manner, satisfactory results may be obtained by what might be termed body coloring and surface coloring.

In body coloring, the coloring matter is thoroughly mixed with the material used in the facing, thereby producing a facing of a uniform color for the entire thickness. The color matter can be used either in a dry form or as a paste. When used dry the most satisfactory results are apparently obtained when the coloring matter is first thoroughly mixed dry with the cement and this mixture mixed dry with the aggregate before adding any water.

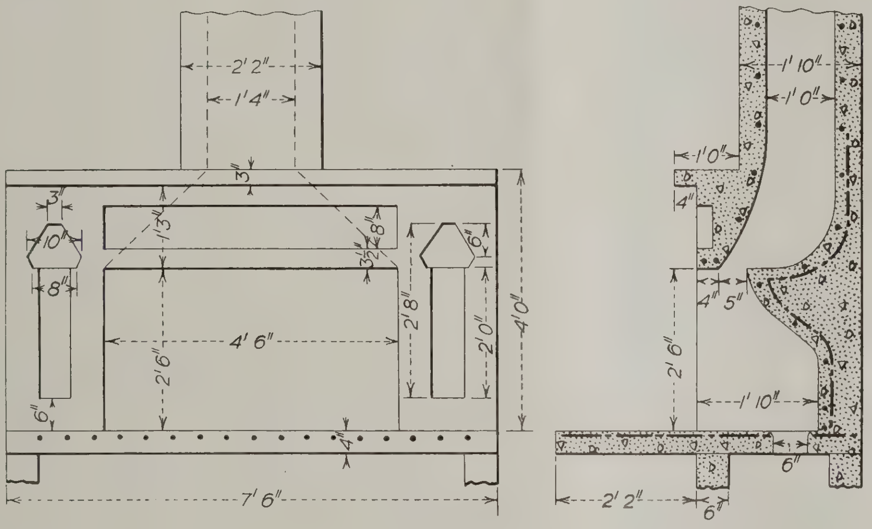


Fig. 9—Elevation and Section of a Concrete Fireplace

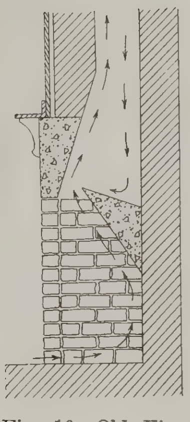
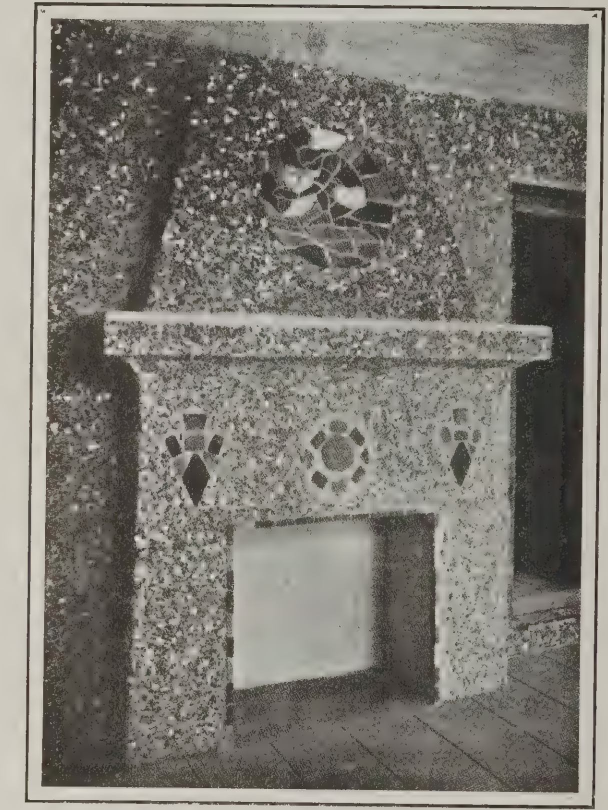


Fig. 10—Old Fireplace Reconstructed

The Fireplace in the Modern Home—Showing How an Old Fireplace May be Fitted with Concrete Shelf

Some prefer, however, to mix all the materials together dry in one operation, while others prefer to add the coloring matter to the mixing water.

The ingredients of cement have a strong generally injurious chemical action upon most of the ordinary pigments. Those of vegetable are most susceptible to this action and for this reason only mineral colors should be used for body coloring. Owing to the danger of impairing the strength of the mixture, only a limited amount of coloring matter can be safely used and it is better to obtain the desired shade by the use of a small amount of a strong, though high priced color rather than by the use of a large quantity of a cheap, weak coloring matter. About 5 per cent. of the weight of the cement is the maximum amount of coloring matter that can be safely used. Owing to the fact that the number of pigments available is limited the different colors and shades to be obtained by body coloring are comparatively few in number.



The Fireplace in the Modern Home—Fig. 11—*Showing Decorative Possibilities of Concrete*

In surface coloring, the coloring material is applied as a thin film or coating on the surface after the concrete has hardened. The results to be obtained with ordinary oil paints when used in this manner are questionable and they should not be used on concrete surfaces.

New Skyscraper for Printing Trades

The latest addition to the colony of towering buildings in what may be designated as the Pennsylvania Terminal Zone, designed for industrial purposes is the 15-story structure with basement and sub-basement for which ground has just been broken in West 31st Street, New York City. It will have a total floor area of 325,000 sq. ft. and is to be devoted to the printing trades. The property has a frontage of 250 ft. with a depth of 103 ft. on its easterly line and 85 ft. on its westerly line.

The building is intended to be the largest and finest of its kind in the city and will rise nearly 240 ft. in height because of its extra high ceilings. The columns will be spaced about 15 ft. on centers and strongly braced at the intersection of girders in order to prevent vibration. It will have permanent unobstructed northern light across the open cut of the Pennsylvania Railroad in the rear of the new Post Office. There are nine elevators, some of which have a lifting capacity of four tons each. It is expected to be ready for occupancy about the first of January next and the estimated cost is placed at $1,100,000. The plans which were filed with the building department May 3 were prepared by Architect Edward L. Larkin.

Meeting of Cement Products Exhibition Co.

As is well-known, the Cement Shows which have been held in Chicago and other cities during the last few years have been under the management of the Cement Products Exhibition Company and at the annual meeting of the stockholders held in June the following directors were unanimously elected:

Edward M. Hagar, President of the Universal Portland Cement Co.
Norman D. Fraser, President of the Chicago Portland Cement Co.
D. McCool, President of the Newaygo Portland Cement Co.
A. Y. Gowen, Vice President of the Lehigh Portland Cement Co.
George S. Bartlett, Vice President of the Edison Portland Cement Co.
B. F. Affleck, General Sales Agent for the Universal Portland Cement Co.
W. E. Cobean, Sales Manager for the Wolverine Portland Cement Co.
J. U. C. McDaniel, Sales Manager for the Chicago Portland Cement Co.
J. P. Beck, Manager Publicity Bureau of the Universal Portland Cement Co.

The report of the directors showed the company to be in good condition and as the policy is to pay no dividends, such surpluses as occasionally remain are devoted to promotion of future exhibitions.

Relative Cost of Parts of Fireproof Office Building

The largest relative cost for any portion of the work in connection with a skeleton steel frame fireproof office building is the masonry which according to a table in R. P. Bolton's book entitled "Building for Profit," figures 33.7 per cent. of the total cost of a building. The steel framing costs but 7.6 per cent. of the whole, not as much in fact as the plumbing fixtures, which cost 12.6 per cent. The plumbing costs but 1.5 per cent.

The other relative costs are given as follows: Foundation, 5.3 per cent.; fireproof floors, 2 per cent.; ornamental iron, 6.3 per cent.; heating, 3.3 per cent.; electric wiring, 2 per cent.; partitions, 1.2 per cent.; joinery, 3.4 per cent.; roofing (tile), 2 per cent.; plastering, 3.8 per cent.; marble, 9.6 per cent.; elevator, 3.1 per cent.; hardware, 0.5 per cent.; glass, 1.3 per cent.; paint, 0.8 per cent.

The cost of supervision, plans, fees and carrying charges during construction should be spread over the other items, as each derives a proportionate benefit therefrom.

Meeting of Baltimore Builders Exchange

The annual meeting and election of officers of the Builders Exchange of Baltimore City held on the evening of June 9 was a most interesting affair. President Morrow made an address covering the work of the organization during the past year, which received the close attention of those present. The date of the meeting marked the twenty-sixth anniversary of the Exchange and the President pointed out that if men who lead in their respective fields of activity really get the spirit of the organization and come into touch with its work, not remotely but intimately, the Builders Exchange of Baltimore will become the greatest single organized force in the city. He called attention to the fact that the opportunity offered through membership in the Exchange for extending acquaintances, the acquiring of new ideas from personal contact as well as the benefit to be derived from united effort in working reforms and in correcting abuses, makes the association an indispensable factor of building interest of the city.

The Membership

In June 1904 the Exchange had a membership of 75 individuals, firms and corporations and in June, 1914 it had a total membership of 307 firms, corporations and individuals. In the early part of May of the present fiscal year a membership campaign was organized, continuing for a period of four weeks with the result that 16 new names were added to the roster and during the fiscal year the number added amounted to 40.

Some time ago a suggestion was made by one of the members that a $50 prize be offered by the Builders' Exchange to the student graduating from the Polytechnic Institute with the highest honors. This idea was carried out and the "Builders' Exchange Prize," as it is known, was awarded to Herman Wacker. For the present fiscal year the honor graduate was Ralph A. Bloomsberg, who had an average of 95 99/100 per cent., this average being the highest ever attained by any graduate.

The president pointed out that at the convention of the Inter-States Association of Maryland, District of Columbia and Virginia, held in Norfolk in February, a change was made in the by-laws and the date of the annual meeting fixed for the Tuesday following the first Wednesday in August of each year. In accordance with this change the next convention will be held on the 10th, 11th and 12th of August, the city of Baltimore having been selected as the place of meeting.

The Officers

The following officials were elected for the ensuing year:

President	Gen. William D. Gill
First Vice-President	Herbert J. West
Second Vice-President	A. J. Dietrich
Third Vice-President	C. Morgan Marshall
Treasurer	S. Frank Bennett
Secretary	I. H. Scates

The following members were chosen to serve on the board of directors for the term of three years: William H. Morrow of Morrow Bros.; John Trainor, plumber and steam fitter; Arthur F. West, a contractor, and E. C. Wilson of Rollman & Wilson.

At the close of the meeting and previous to the evening's entertainment the retiring president, William H. Morrow, was presented with a magnificent case of flat silver, the presentation being made on behalf of the Exchange by former Congressman Hon. Charles R. Schirm. The presentation remarks as well as the testimonial were highly pleasing and touched the hearts of the more than 200 members of the Builders' Exchange who were present. Just as he was about to call Mr. Morrow, he said:

"That which I should do to-night I shall do to-Morrow and that which I would do to-Morrow I shall do to-night."

Mr. Morrow, who is usually ready in reply to most every proposition presented to him, had to acknowledge that on this occasion "that which he had to do to-night he would rather do to-morrow."

The meeting then adjourned to the banquet room of the hotel where an entertainment and lunch had been provided, the following two hours to 12:30 a. m. being spent in a general get-together social session. There were no set speeches, the affair being absolutely informal and was one of the most successful in the history of the Exchange.

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Annual Meeting of Atlanta Exchange

At the sixth annual meeting and election of the Builders Exchange of Atlanta, Ga., held early in May, President J. T. Rose in his annual address pointed out the good work which the Exchange had accomplished in the past and recommended a number of improvements which it was believed will make the Atlanta Builders Exchange one of the strongest organizations of its kind in the country. The statement submitted by Secretary J. D. Wood showed the organization to be in good financial condition. The officers chosen for the ensuing year were:

President	J. T. Rose.
Vice-President	B. Mifflin Hood.
Treasurer	R. M. Walker.
Secretary	J. D. Wood.

The weekly Bulletin which the Exchange has been publishing for some time past is now issued as a part of the Building Review, the weekly organ of the Contractors and Dealers Exchange of New Orleans, La. A copy of this publication is mailed direct to each member of the Atlanta Exchange at the expense of that organization.

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The Cement Show in 1915

Only one Cement Show will be held in 1915 and that will be in the Coliseum at Chicago, Ill., during the week beginning February 10. This month of the year has been selected as it has been found that contractors, cement users and engineers are better able to attend the exhibition at that time than during any other period and it is also the season when the maximum amount of purchasing and specification of equipment and supplies are given attention.

On account of the inability this year of a number of manufacturers to secure space for an exhibit the management of the Cement Show has developed a new floor plan which it is believed will meet with general approval. A greater number of spaces will be provided and it will be possible to give the main avenues an attractive appearance. A uniform installation plan without high partitions will be adopted. The management will again prepare the exhibit spaces so that no attention will be necessary on the part of the exhibitors other than to place their exhibits in position.

It is expected that the floor plans, application blanks and complete information will be sent out from the offices of the Cement Products Exhibition Company to the list of prospective exhibitors not later than August 1 of the present year. An early drawing for space will be held and after assigning space the remainder of the year will be devoted to the advertising of the Show and the promotion of a big attendance of architects, contractors, builders, cement users, engineers and dealers.

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Year Book of the Merchants Association of New York City

The Merchants Association Year Book for 1914, which has just been distributed to the members of that organization, gives the names of nearly 3600 members among whom are the leaders in 157 divisions of business and professional activity in New York City. The membership list represents every trade, industry and profession in the city and consists of individuals, firms and corporations. The division of engineering and building and building equipment has 12 groupings in which professional as well as business interests are represented. The total membership is 154 of which 55 are contracting engineers, building and general contractors—a subdivision in which the membership has been fast increasing during the past year.

The Year Book consists of 212 pages and the names of the members of the Merchants Association are given in the finding list alphabetically arranged and are repeated in classified groups which again are subdivided by trades and industries.

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New York's Forest Products Exposition

If one carefully reads what appeared in the June issue of *The Building Age* and studies the various pictures presented in connection with the description of the recent Forest Products Exposition at the Coliseum in Chicago, he will obtain an excellent idea of the similar exposition which was held in the Grand Central Palace, New York City, on May 21 to 30, inclusive. In fact, the New York display, which was the first of its kind ever held in this section of the country, was really a duplicate of what was presented in Chicago from April 30 to May 9. It was held under the same auspices—that of the National Lumber Manufacturers Association, and was highly educational as to appearance, uses and advantages of many of the woods which enter into our domestic architecture as well as being utilized for a great variety of other purposes.

Many of the exhibits were of an elaborate character and demonstrated in a most striking and convincing manner the beauties of the woods for specific purposes. There were the specimens of houses built many years ago, portions of which had been taken down and the original materials transferred and re-erected at the exposition solely to show the great durability and lasting qualities of the woods. Notable among the displays that of the United States Forestry Service deserves special mention by reason of the many models and charts which showed the utilization of wood and particularly the use of by-products. There were the displays of Douglas fir so designed as to show the corners of four rooms finished in this wood; the interior of the cypress dwelling showing its panels, trays and boxes of what is known as Sugi finish; the handsome library interior finished in red gum; the gateway to the Colonial garden showing the effects produced by the use of white pine; the famous "Nuremberg Haus" showing the possibilities of yellow pine for interior and exterior work; the Bungalow of Michigan and Wisconsin woods; the California redwood section which was the mecca for every visitor entering the portals of the Exposition, as well as many other displays all arranged in a way to strongly appeal to those interested in the products of our forests.

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Sheet Metal Work in New York City's Vocational School

A class in sheet metal work has been formed in the Vocational School at 128th street and Fifth avenue, New York City. The Board of Education has employed Joseph A. Danz as instructor in this class and has supplied the school with a complete equipment of benches for 24 pupils, hand tools and squaring shears, cornice brakes and other machine tool equipment that will enable the pupil to turn out any class of work that may be required in any building. A feature of the course is pattern drafting, for which drawing boards and tools are provided. This school is open every month of the year except during August and a part of September. The day class begins at 9 a. m. and extends to 5 p. m. with an hour for lunch. The school is open to pupils from Greater New York and is absolutely free of cost to those who enroll. Boys from all the boroughs may attend and must be 14 years old, though they need not necessarily be graduates from any of the schools. It is the purpose of these vocational schools to fit the pupil with all the rudiments for beginning actual work which will shorten the time of their apprenticeship. This is an excellent opportunity for young men in Greater New York. All interested should apply to the principal, Charles Pickett, at the address given above.

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Sheet Metal Contractors Meet in Cincinnati, Ohio

As we go to press with this issue of the paper the National Association of Sheet Metal Contractors is holding its annual convention in Cincinnati with headquarters at the New Gibson House Hotel. The exhibits and business meetings are being held at the Masonic Hall. In addition to a consideration of business matters an attractive program of excursions and entertainment has been provided.

New Publications

Estimators' Price Book and Pocket Companion.—By Isaac P. Hicks. Size 3¾ x 6¼ in.; 218 pages. Bound in board covers. Published by the David Williams Company, 231 to 241 West 39th Street, New York City. Price, $1.

When the builder figures on a job he likes to have convenient for reference prices of material of every description, together with other information which will enable him to arrive at approximately correct totals in a brief space of time without the necessity of consulting numerous trade catalogues. The little work under review has been prepared by a man well known in the building trades, and within the covers of the book almost everything required in the construction of an ordinary building has been considered, together with average market prices. In order, however, to provide for variations in figures to meet market conditions, as well as local prices, blank lines have been provided all through the book, so that the contractor can fill in such figures as it may be found desirable in connection with the work in hand. The items have been arranged so as to enable the estimator to quickly find what is wanted, both in regard to size, weight and prices, while the entire matter has been condensed as much as the practical nature of the subject will permit in order to keep the book within a size convenient to carry in the pocket.

The point is made by the author that the field of his well known "Builders' Guide" has not been encroached upon to any extent, as the little work under review has been designed rather to supplement the section of that useful handbook which relates to estimating with a more comprehensive reference to prices of material and labor. The subject matter is comprised in 22 chapters.

Designing and Detailing of Simple Steel Structures.—By Clyde T. Morris, C.E.; 260 pages. Size 6¼ x 9¼ in. Illustrated by means of numerous line drawings. Bound in board covers. Published by McGraw-Hill Book Company. Price, $2.25.

In the presentation of this work the primary object sought has been to collect from the many larger and more exhaustive treatises on structural steel design those parts which are applicable to simple structures and which can be taken up in technical schools in the limited time usually allotted to the subject. At the same time it is intended to show by means of general cases and specific examples how the simple laws of statics may be applied to the details of steel structures, the idea being to produce details which are in accord with the stresses they have to transmit. In the present edition, which is the third, the matter has been revised and reset, the order of presentation of the different topics being changed somewhat from the original edition. In fact, several of the chapters have been practically rewritten and a new one on highway bridges has been added, together with the reprint of the Specifications for Steel Highway Bridges of the State Highway Department of Ohio. Nearly half of the figures in the book have been redrawn and a number of new ones added. The matter is comprised in eight chapters, of which the first deals with designing and estimating, the second is devoted to riveting, the third to mill buildings, following which consideration is given in succession to plate girder bridges, pin connected bridges, details of pin connected bridges, highway bridges and finally, manufacture and erection.

Egyptian Stucco and Other Bungalows.—Designed by the Architectural Department, Egyptian Method Construction Company. Oblong in shape, 10 x 6¾ in. in size. Profusely illustrated. Paper covers. Price 50 cents.

As indicated by the title, this little work consists of a series of bungalows with exteriors of Egyptian stucco, also several of frame and brick construction. The designs are of an interesting variety and in connection with each photograph of finished structure are floor plan, an interior view and brief descriptive particulars, and in some instances the cost price is given.

The statement is made that every house shown within the covers of the little work has been built not once but a number of times and the photographs show that "all the beauty conceived by the designer was possible of incorporation by the builder at the price quoted."

The Egyptian stucco with which many of the bungalows are coated exteriorly is said to be of such a nature as to act slowly to exceeding hardness while the flake cell formation prevents cracking. It is said to contain no sand and is therefore very smooth and plastic which enables it to be laid over building paper instead of over sheathing. The process reduces cost, gives increased lightness of wall and encourages even drying. Sand is used only for "sand finish."

Stencils and Stenciling for All Purposes.—Artistic and Decorative. By Arthur Louis Duthie. 164 pages. Size, 5 x 7½ in. Illustrated with 66 full page plates with frontispiece design in colors. Bound in stiff board covers. Published by The Trade Papers Publishing Company. Price, $1 net.

Those of our readers who are concerned in decorative work are likely to be interested in the volume under review, which has been based upon the idea of the author that "most decorators require help—not so much with the practical as the artistic side of the work—with the designing of a stencil rather than the application of it." As a consequence a great deal of attention is given to details of design and less to the subject of pigments and their handling. The author indicates in a practical way the many possibilities of stencil work and shows how far from truth is the popular notion that the art destroys the individuality of the designer. The illustrations, of which there are many, are given more as demonstrations of the text than as actual models to be copied, and most of them are capable of being treated in many different ways. The work is comprised in 12 chapters and is illustrated by 66 full page plates.

Brief Review of the Building Situation

Figures Showing Building Activities in Leading Centers Based on Permits Issued in May, 1914, and May, 1913

BUILDING operations throughout the country in the month of May reflected very little change in the estimated value of the improvements projected as compared with the same period a year ago, reports from 100 cities indicating an increased activity of only 3.1 per cent. in favor of 1914. The gains and losses however are widely scattered, the leading cities in the eastern and middle states showing gains in the aggregate over a year ago, while the southern and extreme western states indicate a heavy shrinkage, more especially the latter. Of the 100 cities reporting, 53 show increases and 47 decreases as compared with the month of May, last year.

For convenience in reference we have divided the country geographically into four sections and in the tables which follow is indicated the new work for which permits were issued during the two periods named. Taking first the eastern cities of the country we find 20 showing a gain and 15 a loss as compared with May last year, the total being a gain of 12.3 per cent.

Cities in Eastern States

	1914		1913	
Albany	455	569,565	295	399,665
Allentown, Pa.	42	154,950	44	168,400
Altoona, Pa.	98	122,813	118	88,794
Bayonne	28	74,420	35	198,359
Boston	532	6,399,000	498	5,009,000
Brockton, Mass.	...	167,885	...	87,890
Buffalo	494	1,124,000	431	1,568,000
Elizabeth, N. J.	52	199,045	71	331,839
Erie	170	201,117	165	315,730
Harrisburg	31	129,175	36	125,050
Hartford	104	430,159	139	674,530
Hoboken	24	144,405	22	59,839
Holyoke	28	70,329	26	111,625
Jersey City	143	499,427	148	617,391
Lawrence, Mass.	34	96,952	25	51,550
Newark	219	809,488	305	1,683,705
New Bedford	138	278,975	125	345,860
New Haven	138	307,200	118	351,936
New York:				
Manhattan	528	8,656,959	480	5,926,544
Bronx	412	1,519,258	331	3,247,934
Brooklyn	1,010	3,852,523	956	3,100,670
Queens	...	2,300,879	...	2,038,066
Passaic, N. J.	37	181,090	29	97,745
Paterson, N. J.	86	173,471	59	101,560
Philadelphia	1,731	6,264,040	1,472	4,170,095
Pittsburgh	410	1,592,209	425	841,716
Portland, Me.	49	204,980	51	160,550
Reading	45	73,650	24	65,625
Rochester	412	1,343,781	330	1,078,387
Scranton	88	104,161	59	140,537
Springfield, Mass.	232	775,616	141	363,840
Trenton, N. J.	95	160,357	86	253,454
Troy	91	36,185	86	102,066
Utica	83	184,795	89	184,185
Wilkes-Barre	63	53,978	51	53,256
Worcester	179	645,401	188	884,047

Next in order geographically considered are the cities in the middle states, and here we have 18 showing a gain and 14 a loss with an aggregate gain of 6.7 per cent. The striking decrease is found in Chicago where the falling off is more than 20 per cent. as compared with last year. Cincinnati, Cleveland, Indianapolis, Milwaukee, St. Paul and St. Louis show appreciable gains.

Cities in the Middle States

	1914		1913	
Akron	297	399,650	357	584,380
Cedar Rapids	80	321,000	68	293,000
Chicago	778	6,919,150	1,232	8,918,600
Cincinnati	1,330	1,181,715	1,227	790,572
Cleveland	1,460	2,201,820	1,232	1,958,025
Columbus	359	841,000	667	613,338
Davenport	78	142,412	42	224,300
Dayton	145	435,671	39	54,825
Des Moines	96	202,465	103	282,535
Detroit	919	3,039,925	1,135	3,900,645
Duluth	218	340,365	177	282,750
East St. Louis, Ill.	73	126,060	88	216,325
Evansville	164	168,186	141	183,593
Fort Wayne	109	352,375	127	237,250
Grand Rapids	177	304,759	242	320,957
Indianapolis	723	1,547,787	672	1,088,479
Kansas City, Mo.	332	1,177,915	326	1,129,660
Kansas City, Kans.	93	109,106	70	150,858
Lincoln, Neb.	53	88,932	57	131,095

Cities in the Middle States (Continued)

	1914		1913	
Milwaukee	536	1,684,989	527	1,390,866
Minneapolis	745	3,160,685	835	1,260,645
Omaha	165	1,146,853	162	477,000
Peoria	66	272,015	55	607,480
Rock Island, Ill.	65	123,031	74	80,000
Saginaw	99	82,020	39	92,100
St. Louis	1,017	1,496,603	900	1,392,655
St. Paul	411	1,503,214	439	1,074,108
South Bend	55	467,106	77	223,030
Springfield, Ill.	56	108,175	43	120,040
Toledo	357	792,159	286	479,930
Topeka	50	33,291	52	121,204
Youngstown	109	446,442	116	414,864

In the southern states there are 9 cities showing an increase over a year ago and 8 a decrease, the total for the entire section representing a loss of 9.1 per cent. The important increases are represented by Baltimore, Nashville, Richmond and Washington, while decreases are shown in Dallas, Texas; Memphis, New Orleans and Atlanta.

Cities in the Southern States

	1914		1913	
Atlanta	319	732,299	311	771,657
Baltimore	466	1,032,200	346	835,147
Beaumont, Tex.	73	73,493	...	22,088
Charlotte, N. C.	27	49,245	37	123,053
Chattanooga	224	78,400	196	76,390
Dallas, Tex.	200	540,100	192	1,107,405
Fort Worth, Tex.	52	215,570	84	179,627
Louisville	240	459,830	245	367,460
Memphis	332	304,695	326	417,412
Nashville	78	203,402	60	117,275
New Orleans	...	218,350	...	418,086
Norfolk, Va.	76	261,069	77	420,102
Richmond, Va.	108	370,034	118	292,651
San Antonio	200	224,035	238	275,156
Tampa, Fla.	119	101,945	119	152,893
Waco, Tex.	...	194,259	...	176,270
Washington, D. C.	539	1,054,404	455	976,332

Taking now the leading cities of the country west of the Dakotas, Kansas and Nebraska, 7 indicate a gain as compared with May last year while 10 show a loss, the aggregate for this entire section being a loss of 32 per cent. This is due largely to the very heavy shrinkage in Los Angeles, Oakland, Pasadena, Portland, Ore, Spokane and Tacoma. The cities showing increases as compared with May last year embrace Sacramento, Salt Lake City, San Francisco, Stockton, Cal., and Colorado Springs, Colo.

Cities in Western States

	1914		1913	
Berkeley, Cal.	97	151,000	77	180,800
Colorado Springs	26	118,764	41	22,390
Denver	...	218,030	...	224,430
Los Angeles	834	1,478,703	1,499	3,735,410
Oakland	307	366,728	317	1,282,145
Pasadena	152	206,417	134	380,588
Portland, Ore.	542	643,880	604	848,530
Pueblo	28	32,370	31	37,635
Sacramento	120	508,549	86	103,012
Salt Lake City	119	300,914	102	240,775
San Diego	...	312,626	...	385,995
San Francisco	523	1,781,148	479	1,728,244
San Jose	40	78,072	31	51,868
Seattle, Wash.	866	809,405	919	683,380
Spokane	81	103,542	108	1,344,990
Stockton, Cal.	46	556,537	35	71,510
Tacoma	125	187,391	183	231,902

For the first five months of the year the showing is practically the same as at the end of April, the loss being practically 5 per cent. as compared with the corresponding period of 1913.

The new women's jail, court and detention house which is to be erected in West Thirtieth Street near Seventh Avenue, New York City, will cover a plot 100 ft. square and will have a hight of 16 stories. The plans have been prepared by Griffin & Wynkoop, architects, 30 Church Street, and the cost is placed in the neighborhood of half a million dollars.

Burt Ventilators Did It

The Danielson Cotton Mill, at Danielson, Conn., suffered with the ventilating troubles common to textile mills until equipped with Burt Ventilators. Thirty-four 30″ Burt Double Damper Ventilators were installed on the Danielson weave shed—a pretty nice little order for the metal worker who did the job.

The Danielson people wanted the best ventilator they could find—and they got it. "The Burt is the Best," as their letter of appreciation, after a period of satisfied use, testifies. **You** are assured of equally profitable work if you are a Burt representative.

It will pay you to investigate the Burt—it will pay you to handle the Burt. Write for details.

The Burt Manufacturing Co.

312 Main Street, Akron, Ohio

GEO. W. REED & CO., Montreal, Sole Manufacturers of "Burt" Ventilators for Canada.

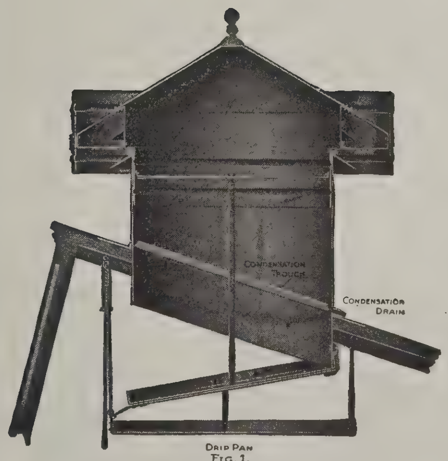


Fig. 1.
Double Damper Ventilator - Open.

Burt Double Damper Ventilator.
(Patented)

LOOK OUT FOR THIS COUPON AND THEN MAIL IT

Send me a Copy of your SMITH "MASCOT" MIXER Booklet No. 87-S

Name ....

Address ....

LARGE PROFITS

On the 50 to 60 Yards Per Day Concrete Jobs

Large profits on the small job are only possible where you can reduce your mixing costs to the minimum.

Now! Give us five minutes of your time and we'll show you how to cut your mixing costs more than in half. One man mixing concrete by hand can turn over about 3 cubic yards of concrete daily, therefore it will take from 16 to 20 men to turn out 50 to 60 cubic yards. Here is where you can make a **big saving in your mixing cost. 4 or 5 men can mix and place 50 to 60 yards of perfectly mixed concrete daily with the**

SMITH "MASCOT" MIXER

What is the result? You save the time of 12 to 15 men—$24.00 to $30.00 daily. In other words, you can make the job pay for the mixer in from 5 to 6 weeks. Is it worth while? Contractors all over the country think so, for they have purchased the Smith "Mascot" Mixer and advise that they are doubling their profits with ease. The "Mascot" is a light, portable, all-steel mixer, holding 4 cubic feet of mixed concrete per batch—5 to 6 yards per hour. It retains the duo-cone drum and tilting discharge of the standard Smith Mixer and also has new features all of its own.

IT WILL PAY YOU TO INVESTIGATE

THE T. L. SMITH COMPANY

1134S 32nd Street, MILWAUKEE, WIS.
1331 Old Colony Bldg., CHICAGO, ILL.

J. E. KING
624 Germania Savings Bank Bldg.
PITTSBURGH, PA.

PERKINS & CO.
1115 Oliver Bldg.
BOSTON, MASS.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to
do with the Various Branches of the Building Business

Majestic Burglar-Proof Cellar Window

For the purpose of rendering the basements of houses proof against the entrance of burglars the Majestic Company, 422 Erie street, Huntington, Ind., has just placed upon the market what is known as the Majestic Burglar-Proof Foundation Window, an outside view of which is shown in Fig. 1 of the illustrations. This window consists of a sectional cast iron frame, a wrought iron guard and galvanized iron sash so designed as to allow the glass to be put in through a slotted opening in the top the sash. The opening is of sufficient size to admit of a ¼-in. plate or common window glass. The latter can be surrounded with putty, thus making it absolutely air tight. The cross bars constituting the window guard, pass through the frame and are securely fastened in place with cotter-keys which are on the inside of the frame. There are no bolts or rivets exposed, thus making it impossible for the window guard to be removed from the frame. The outside of the frame has a hollow space which allows the mason to fill in with cement between the foundation in such a way as to cause the frame to become practically integral with the foundation itself. The frames are made in four sections which are bolted together at the corners. As the bolts are on the inside of the frame they do not show either inside or out. Each frame is supplied with hinges and lock. The company states that when so desired wooden sash can be used instead of metal, although the latter is not liable to rot nor will the metal frames shrink away from the foundation as wooden frames often do, allowing cold air to enter the cellar.

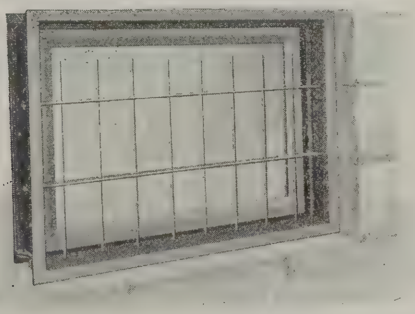


Fig. 1—The Majestic Burglar-Proof Cellar Window Showing Outside View

New Agency for "Standard" Low Charging Mixers

Charles J. McCarty & Co., 65 Oliver Street, Boston, Mass., have been appointed eastern New England agents for the "Standard" low charging concrete mixers and contractors tools made by the Standard Scale & Supply Company of New York, and with offices in many of the leading cities of the country. Charles J. McCarty & Co., who are located in the heart of the machinery and supply house district and near the financial center of Boston, state that they sought the agency for the "Standard" low charging mixer on account of several points of advantage which are distinctive of this line. The mixers are built low and designed so that the drums can be directly charged from wheelbarrows, thus requiring very slightly inclined runways. The load is dumped immediately into the drum without extra handling which greatly reduces labor and operating costs. We understand that Charles J. McCarty & Co. will mail upon request to interested builders and contractors a copy of their catalogue 48Y which contains illustrations and complete descriptions of the mixer and equipment line.

Bermico Sheathing Paper

The Berlin Mills Company, Portland, Maine, and with New York office in the Woolworth Building, calls attention to the fact that the builders sheathing paper which it manufactures under the "Bermico" brand, contains no cheap dead filler, but it made throughout of pure clean tough fibre which makes it extremely durable and an efficient insulating paper from heat or cold as well as a good sound deadener. It is put up in two standard colors—red and green—in the usual 36 inch and 40 inch rolls containing 500 square feet per roll and in two weights or thicknesses, the "A" running about 80 rolls to the ton and the "AA" about 50 rolls to the ton. "Bermico," although of superior quality and unusually good value for the money, is said to cost but little more than the ordinary kind of sheathing paper.

The Aloe Convertible Level

A level which has been made to be used by the man who has none of the technical knowledge and training of the engineer or the surveyor and which is especially adapted to meet the wants of the builder, the architect and the farmer, is the device illustrated in general view in Fig. 2 of the engravings and which is known as the Aloe Convertible Level. It is called a convertible level because while having all the advantages of the ordinary level it possesses features which permit of its being used for many purposes for which ordinarily a transit would be required. It is so made by A. S. Aloe Co., St. Louis, Mo., as to be especially useful in determining differences of elevation; leveling buildings and foundations; for running straight lines for buildings, fences, curbing, ditches, etc.; for lining up buildings, walls, shafting, etc.; for laying out plots of

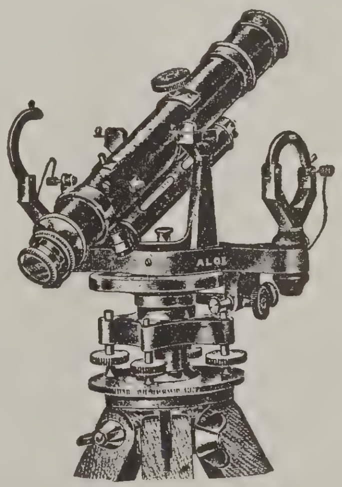


Fig. 2—General View of the Aloe Convertible Level

ground; setting out orchards, etc., and for getting all the various angles needed in building. The picture affords an excellent idea of the appearance and arrangement of the various parts so that extended description would not appear to be necessary. In a 16-page pamphlet sent out by the company the salient features of the level are presented and directions are given telling how to solve the problems with it. The matter is presented in such a way as to be readily understood and any reader of the paper who may desire a copy of the pamphlet can obtain one on application to the address above given.

Steel Ceiling Construction

Some half-tone pictures in the shape of attractive plates sent out by the Wheeling Corrugating Co., Wheeling, W. Va., not only show the design of the finish, but also give an idea of the price for finishing rooms of different sizes. They also show how the furring strips must be placed in order to afford a substantial support for the ceiling plates and to enable them to present such a smoothness of finish that the joints cannot be seen when the ceiling is finished and painted. The company is prepared to give expert assistance to those who are undertaking this class of work.

A Weather Strip for Doors

The necessity often arises for placing weather strips on doors in order to prevent the entrance of cold air, dust, etc., through the spaces caused by the wearing away of the threshold in the center, also around the frame of the door due to shrinkage. A weather strip to satisfactorily serve the purpose must be inexpensive, durable and easily installed. Further, it must not have any moving parts which are likely to soon wear out with use. A strip which embodies features that practical experience has demonstrated meets the requirements of the case is the "Pullman" made by the Pullman Weather Strip Company, York, Pa. The details presented in Fig. 3 show how the strip is installed around a door in order to exclude the elements as well as dust and noise. A heavy brass sill is attached to the threshold and a brass hook which is fastened to the bottom of the door interlocks with the sill when the door is closed, thus making it weatherproof. On the lock, hinge and top sides there is a special spring bronze which is attached to the casing and springs against the door when closed, thus preventing the entrance of rain or dust at these points. A regular beaded strip is sometimes used on the back of the door, but this necessitates cutting a groove in the edge of the door as shown in one of the details. The spring bronze used on the lock side must be cut out to permit the lock to work properly, therefore a special strip, known as a "lock strip," is installed which prevents the entrance of air around the keeper of the lock. This strip is sold direct to builders and carpenters with full instructions as to the method of installation and any mechanic capable of using ordinary tools can install a door complete in about two hours. The weather strip equipment consists of a brass sill, drilled and countersunk for screws; a brass hook for the bottom of the door; spring bronze; brass rider; bronze lock strip; brass screws and coppered nails. The company in question also makes a full line of weather strips for double-hung windows, casement windows and transoms.

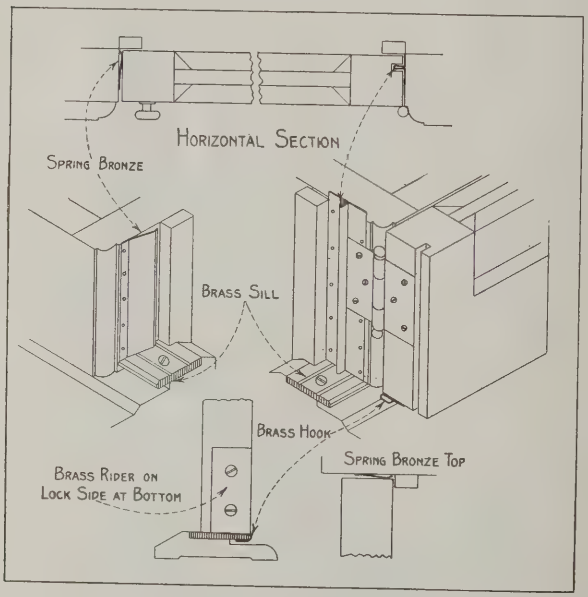


Fig. 3—Various Details of the "Pullman" Weather Strip for Doors

A New Snow Guard

The Loop the Loop wire snow guard, made by the Danzer Metal Works, Hagerstown, Md., shown in Fig. 4, is fastened in place by driving the sharpened spike into the roof with a hammer. The other end rests on the roof and will gather the snow and prevent it from sliding off the roof. The loop can be furnished in galvanized, copper or brass wire, as may be desired. It has the advantage of being practically invisible on the roof, after a short exposure, and has the strength of the wire, aided by the brace afforded by the construction shown.

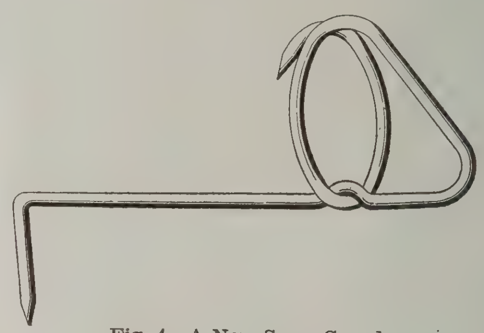


Fig. 4—A New Snow Guard

The Goodell "Steel" Miter Box

In order to meet the current requirements of the trade the Goodell Mfg. Company, Greenfield, Mass., has incorporated a number of improvements in its "steel" miter box, a general view of which we present in Fig. 5. The company has introduced new steel plates with angular serrations on the bed and made other changes which the trade cannot fail to appreciate. The bed or main frame of the miter box is of high grade bar steel and is shaped and strongly riveted in the form of a truss; in fact, it is built like a modern steel bridge, which its mechanism closely resembles. The construction is durable and accurate while the special improvements which have been incorporated allow of the placing of the work by the operator with both hands. The lever carrying the saw may be swung from 45 to 90 degrees either right or left and will lock automatically at all the regular and most used angles. This is accomplished by simply pulling forward a small knob on the side of a lever. Angles more acute than 45 degrees

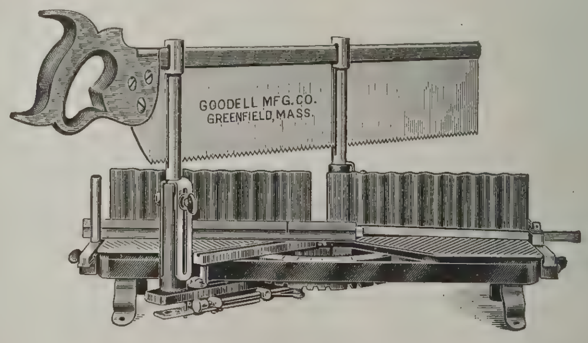
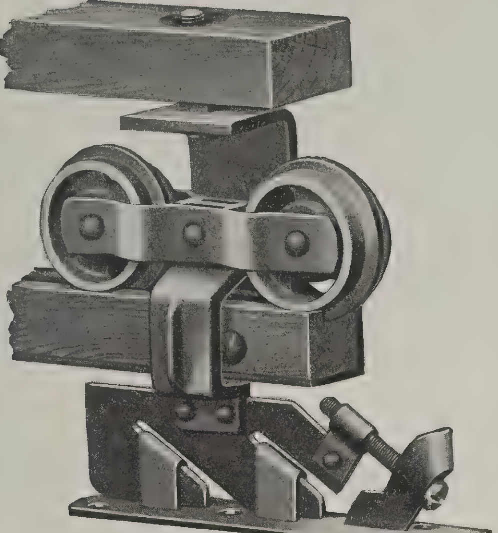


Fig. 5—View of the Goodell "Steel" Miter Box with Saw in Raised Position

(*Continued on page 74*)

Richards-Wilcox



No. W-122
R-W Le-Roy House Door Hanger

A sliding door's a wondrous thing
It saves a deal of space,
And doesn't have the slightest chance
To strike one in the face.

'Tis the duty of the architect
To specify the thing
Which makes a door a better door
Without that needless swing.

To "efficiency, convenience,"
And "economy of space,"
Add a Richard-Wilcox hanger
And the Ideal door's in place.

No. R-122
R-W Royal House Door Hanger

Get them at your dealers

Ask for the R-W Hangers in the Golden Rod Carton

Your clients will thank you and so will we

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.

A hanger for any door that slides

Nature's storehouse is unlocked;
it yields an "everlasting waterproofer"

Natural asphalt is the most valuable and lasting waterproofer and weather-resister known. It makes ideal roofing—full of life and vigor that resist rain, sun, wind, snow, heat, cold, and fire.

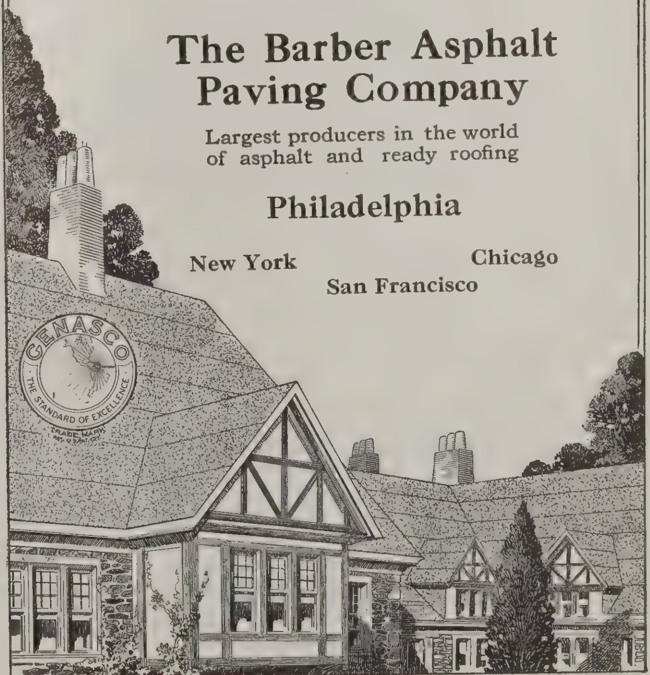
With the aid of modern science we mine, refine, and make into roofing the most uniform, the toughest and longest-lived asphalt ever discovered.

Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

has wonderful endurance because the natural oils of the asphalt are retained in the roofing and keep it pliable. They make Genasco proof against weather in all climates.

Let us send you samples, and the Good Roof Guide Book which explains the advantages of Genasco in detail. They are free on request.

Ask your dealer for Genasco—smooth or mineral surface. Several weights. Look for the trademark. THE KANT-LEAK KLEET makes seams watertight without cement and prevents nail-leaks.



The Barber Asphalt Paving Company
Largest producers in the world of asphalt and ready roofing
Philadelphia
New York Chicago
San Francisco

MAJESTIC COAL-CHUTES

Protect the Building

Acts as a window when not in use.

Made in two styles and two sizes.

Send for complete catalogue showing our Burglar Proof all metal Cellar Window.

THE MAJESTIC GARBAGE RECEIVER

Buries under the ground keeping the contents cool in summer and from freezing in winter.

Also contains a device for burning waste paper and refuse.

Write for full description.

THE MAJESTIC CO., 422 Erie St., Huntington, Ind.
Branch Office and Warehouse:
311 Reliance Bldg., Kansas City, Mo.

PREPARED

Is the contractor who has his "Big-an-Litle" Mixer ready for the first job in the Spring.

and that is where the

"Big-an-Litle" Fills the Bill
BECAUSE

It is built of the best iron and steel—by the best mechanics.
It mixes all kinds of concrete, mortar, etc.
It requires very little operating expense, and attention.
It costs next to nothing for upkeep.
It is always ready to do business every day.
It is priced to you on a cash basis and sold at a low figure.
It can be furnished with or without power, or with a Hoist, or Loader, and the engine can be used for other purposes.
A mixer and outfit built for YOUR particular purpose.

Get our catalog and information and your "Big-an-Litle" will come later. Increased profits—More contracts—Better quality work, all go Hand in Hand with the "Big-an-Litle."

The Yaeger Machine Co.
216 W. Rich St., Columbus, Ohio

are obtained by the angle attachment, which is also used as a molding holder. This with the length gauge for cutting duplicate parts of any length up to 20 in. is easily set to position and fastened by means of thumb screws. While these useful devices are a part of every complete box, they are furnished in the form of patented attachments which can be easily removed or replaced by means of four screws. The serrated steel plates which cover the bed and form the bottom of the box are most effective in holding the work from slipping. This, as every mechanic knows, is a very important feature. The advantages of an unbreakable miter box have been appreciated by supervisors and instructors in manual training schools, and the "Goodell," by reason of its indestructibility, has been adopted by a number of the cities of the country for use in their manual training schools. The special features which are peculiar to the "Goodell" and many of which are covered by basic patents include steel truss frame or bed; cold rolled steel corrugated back; wrought steel lever or saw support; automatic detents for holding up the saw; steel bottom plates with angular serratures, and finally long saw guides.

Boring Machine No. 146

A tool now being placed on the market and which embodies in its construction a number of new features is the boring machine illustrated in Fig. 6 and made by the Millers Falls Company, Millers Falls, Mass., and with New York office at 28 Warren Street. The base, the uprights, the angle rods, the spindle and the cranks are of steel, the tool having a hight of 25½ in. The construction is such that the frame is locked in its topmost suspension automatically and is released simply by pressure upon a thumb latch. With the machine, which is known as No. 146, holes may be bored vertically or at any angle from the vertical within an arc of 50 degrees. The depth of hole is regulated by an adjustable stop. The auger is removed from a hole by a few backward revolutions of the cranks to loosen the worm of the bit pressure with cranks to the left automatically engaging a clutch and forward revolutions of the cranks. The machine is fitted with adjustable cranks for regulating the speed and the power. It is regularly made to bore 12 in. but it can be furnished to order for greater depths at a small increase in price.

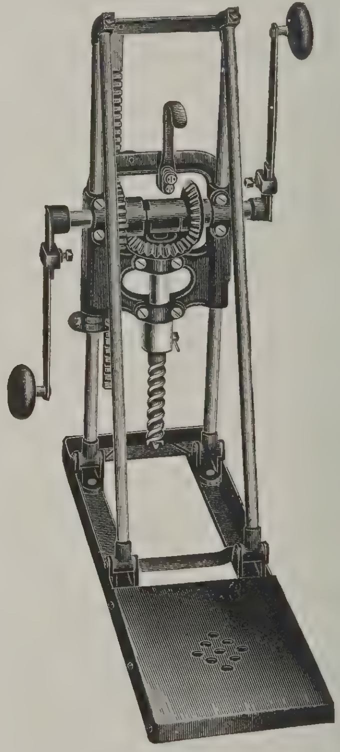


Fig. 6—General View of Boring Machine No. 146

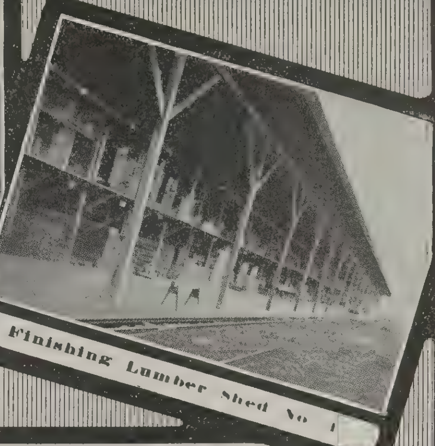
The "Disston" Standard of Quality

In discussing the merits of the goods turned out by Henry Disston & Sons, Philadelphia, Pa., the point is

(*Continued on page 76*)

Loading Lumber on Track No. 3

Shipping Platform No. 3



Finishing Lumber Shed No. 1

Contractors and Carpenters, Read

July Challenge Prices!

Quick Service—Quality Goods!

More Than 10,000 Contractors, Carpenters and Builders Are Our Regular Customers

Lumber—Doors—Windows—Casings

Save $100 to $300 per Car on Dressed or Rough Lumber!

Casings

Yellow Pine Pilaster Casings, random length, 8 to 16 ft. 13-16x 4¼ in. Per 100 lineal feet **$1.80**

(Specified lengths 10 per cent extra)

Craftsman Casings, Black band, size 13-16x1⅛ in., Red Oak. Price per 100 lineal feet.. **$1.05**

Also most complete line. All quality casings. All bargain prices.

Mouldings

Cove Moulding, per 100 lineal feet clear ¾x⅞ Yellow Pine **33c**

Also 1 3/16 x 1⅛..........41c

Also White Pine and Oak, 40c and 75c

Also largest selection in all mouldings in all woods, most **artistic designs,** highest quality. All bargain prices.

Write for Free Estimate on Your Lumber Order

5,000 BARGAINS SHIPPED ANYWHERE

"Quality" Paint—an ideal special Gordon-Van Tine mixed paint for houses. Full measure and full satisfaction guaranteed or new paint free. All colors shown in free catalogue or at our store.

Quarts	$0.35
Half Gallon	.65
Gallon Cans	1.22
Five-gallon Kits, per gallon	1.17

Also Quality Barn Paints at even lower prices; 75c per gallon and up.

All Builders' Hardware

Screen Door Latch...65c to	.85
Screen Door Tension Hinge	.75
Combination Screen and Storm Sash Hangers, per set	.10

Windows

2-Light, 26x28, 1⅜ check, single strength	$1.24
2-Light, 40x40 and 16, 1⅜ check, top leaded	3.90

Doors

2-8x6-8 1⅜ One Panel Fir	$2.64
2-8x6-8 1⅜ Five Cross Panel Yellow Pine	2.09

Door Frames

Outside and inside. Plain and moulded cap, plank frames and inside door frames or jambs. Prices .... **$1.65** and up for frames.

50c and up for jambs. See free catalogue.

Window Frames

Plain Cap, Moulded Cap and Box Window Frames, Sash Frames and Cellar Sash Frames. Big bargain prices now. All sizes ready to ship quickly. Four light window frames 2 ft. 1 inch x4 ft. 6 inches, opening (10x12 glass). Per frame with 13-16 inch outside casing, each **$1.22**

Porch Materials

Turned Columns, 4x4 length 8 feet Washington Fir. Price, each **55c**

All sizes up to 6x6 length 9 feet at............. **$1.40**

Colonial Newels, 4 feet long; diameter of shaft at base 8 ins. Clear Cypress, each.... **$1.40**

Also all porch materials at big bargains now. See free catalogue.

We Guarantee Safe Delivery to Your Station

Write for Our Grand 5,000 Bargain Catalog NOW!

GORDON-VAN TINE CO.

712 FEDERAL ST. DAVENPORT, IOWA

The WINDOW CHUTE

For Your Coal Bin

Ready for the Coal Man.

The Window Chute is a selling feature for any Residence or Building.

Thousands in Use—
The Very Best

If You Build
Buy
Own

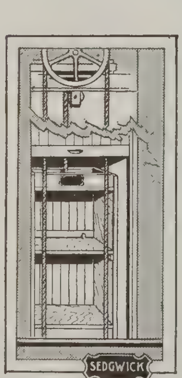
Be up to date and have the world's best.

Write for Booklet C

A Light Basement.

HOLLAND FURNACE CO.
Holland, Mich.
World's Largest Direct Installers of Furnaces

The Demand for
GOOD DUMBWAITERS
is increasing!



Each job presents special requirements. Some one type of Dumbwaiter will give better results than any other.

The Sedgwick Machine Works have compiled a new catalogue giving full details of many different types. It is sent on request and you should have a copy.

All catalogue sizes and types are carried in stock.

Telegraphic orders filled same day they are received.

Blue prints and complete directions for erecting sent with each outfit.

Sedgwick Machine Works
123 Liberty Street
New York City

made that from the very beginning, which was 74 years ago, a high standard was set for the Disston brand. In order to maintain this standard, which has been raised from time to time to keep pace with the onward march of progress, Mr. Disston, who was himself a finished mechanic, sent his sons into the shops to learn the business from the bottom up. The sons in turn placed their sons in the shops until the intricacies of the business have been thoroughly mastered. By this arrangement the sons and the grandsons of the founder of this widely known business are all practical men, and the trade may rest assured of the maintenance of the high quality and efficiency of the goods turned out by the Disston works.

Slate as a Roofing Material

Various slate interests of the eastern section of the country have for a long time past felt the desirability of making some effort in common to emphasize the merits of slate for roofing and structural purposes and several of them have therefore grouped their announcements together in another section of this paper under a heading reading "Slate Makes the Best Roof." These concerns have no financial interest in each other but will compete as aggressively as ever before and continue to discuss the relative merits of the slate from each particular vein or section, at the same time all being agreed that slate as such makes a most satisfactory roofing material. It is claimed for roofing slate in general that it is the only roof covering delivered to the consumer in its natural mineral state unchanged except in form; that it does not require painting; is fireproof, and is as durable as the building itself.

The United States Geological Survey in a report just issued covering the production of slate in 1913, states that for general purposes slate is classified as mill stock and roofing slate and the use for these different purposes depends largely, although not entirely, on the character of the slate. Mill stock requires a finer, more even-grained and more compact slate than roofing slate with a smooth cleavage surface. It must be of a fairly uniform color and not too hard to be easily worked by the slate dressing machinery. Mill stock includes slate used for blackboards, school slates, flooring, wainscoting, tiles, sinks, laundry tubs, sanitary ware, refrigerator shelves, flour bins and dough troughs for bakeries, grave vaults, electrical switchboards, mantels, hearths, laboratory, kitchen and other table tops. This material is made in the form of slabs from 1 in. to 3 in. or more thick and is sold at so much per square foot, according to the size, thickness and quality of the slate, and to the work done on it.

Slate used for roofing must be hard, strong and tough. Roofing slate is sold in the United States by the "square," this meaning a sufficient number of pieces of slate of any size to cover 100 sq. ft. of roof with allowance generally for a 3-in. lap, the size of the pieces of slate making up a square ranging from 7 x 9 in. to 16 x 24 in., and the number of pieces in a square ranging all the way from 85 to 686.

New Stripping Pliers for Electricians

A tool of special interest to electricians is the new stripping plier which has been added to the extensive "Red Devil" line of electricians and linemen's tools by the Smith & Hemenway Company, 150 Chambers Street, New York City, and illustrated in Fig. 7 of the cuts. The stripping is accomplished by means of two stripping blades set one in each member of the plier immediately behind the head. The body of the blades is threaded, thus permitting of the most minute

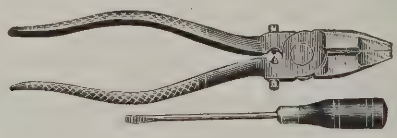


Fig. 7—New Stripping Plier for Electricians

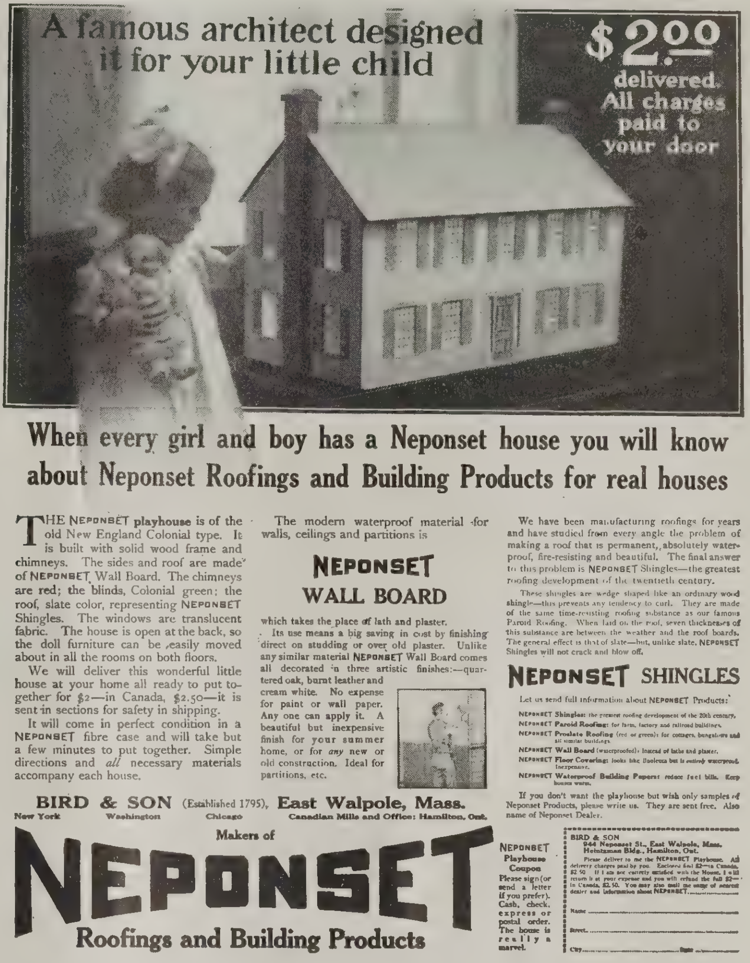
(*Continued on page 78*)

EVERY reader of this magazine will be interested in this Neponset Advertisement

It appeared in the Saturday Evening Post, June 20th, and was read by more than 2,000,000 people.

These little NEPONSET Houses are now being sent to all parts of the United States and Canada.

Saturday Evening Post
(June 20th)



A famous architect designed it for your little child

$2.00 delivered. All charges paid to your door

When every girl and boy has a Neponset house you will know about Neponset Roofings and Building Products for real houses

THE NEPONSET **playhouse** is of the old New England Colonial type. It is built with solid wood frame and chimneys. The sides and roof are made of NEPONSET Wall Board. The chimneys are red; the blinds, Colonial green; the roof, slate color, representing NEPONSET Shingles. The windows are translucent fabric. The house is open at the back, so the doll furniture can be easily moved about in all the rooms on both floors.

We will deliver this wonderful little house at your home all ready to put together for $2—in Canada, $2.50—it is sent in sections for safety in shipping.

It will come in perfect condition in a NEPONSET fibre case and will take but a few minutes to put together. Simple directions and *all* necessary materials accompany each house.

The modern waterproof material for walls, ceilings and partitions is

NEPONSET WALL BOARD

which takes the place of lath and plaster.

Its use means a big saving in cost by finishing direct on studding or over old plaster. Unlike any similar material NEPONSET Wall Board comes all decorated in three artistic finishes:—quartered oak, burnt leather and cream white. No expense for paint or wall paper. Any one can apply it. A beautiful but inexpensive finish for your summer home, or for *any* new or old construction. Ideal for partitions, etc.

We have been manufacturing roofings for years and have studied from every angle the problem of making a roof that is permanent, absolutely waterproof, fire-resisting and beautiful. The final answer to this problem is NEPONSET Shingles—the greatest roofing development of the twentieth century.

These shingles are wedge shaped like an ordinary wood shingle—this prevents any tendency to curl. They are made of the same time-resisting roofing substance as our famous Paroid Roofing. When laid on the roof, seven thicknesses of this substance are between the weather and the roof boards. The general effect is that of slate—but, unlike slate, NEPONSET Shingles will not crack and blow off.

NEPONSET SHINGLES

Let us send full information about NEPONSET Products:

NEPONSET **Shingles:** the greatest roofing development of the 20th century.
NEPONSET **Paroid Roofing:** for farm, factory and railroad buildings.
NEPONSET **Proslate Roofing** (red or green): for cottages, bungalows and all similar buildings.
NEPONSET **Wall Board** (waterproofed): instead of laths and plaster.
NEPONSET **Floor Covering:** looks like linoleum but is *entirely* waterproof. Inexpensive.
NEPONSET **Waterproof Building Papers:** reduce fuel bills. Keep houses warm.

If you don't want the playhouse but wish only samples of Neponset Products, please write us. They are sent free. Also name of Neponset Dealer.

BIRD & SON (Established 1795), East Walpole, Mass.
New York Washington Chicago Canadian Mills and Office: Hamilton, Ont.

Makers of
NEPONSET
Roofings and Building Products

NEPONSET Playhouse Coupon
Please sign (or send a letter if you prefer). Cash, check, express or postal order. The house is really a marvel.

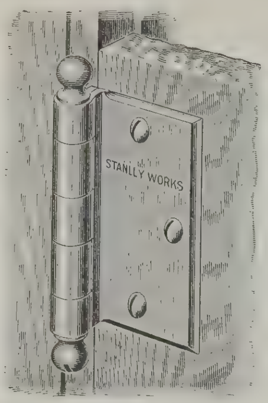
BIRD & SON
944 Neponset St., East Walpole, Mass.
Heintzman Bldg., Hamilton, Ont.
Please deliver to me the NEPONSET Playhouse. All delivery charges paid by you. Enclosed find $2—in Canada, $2.50. If I am not entirely satisfied with the House, I will return it at your expense and you will refund the full $2—in Canada, $2.50. You may also mail me name of nearest dealer and information about NEPONSET.
Name
Street
City State

The house is made of our products, and is a symbol of our business—which is the manufacture of NEPONSET Waterproof Building Products—NEPONSET Shingles, NEPONSET Waterproof Building Paper, NEPONSET Roofings, and NEPONSET Wall Board.

The high quality of NEPONSET Products is well known among builders and contractors, and carpenters, and we believe that this little house will be the means of increasing this reputation with the public at large, especially with those who are building at this time.

BIRD & SON (Est. 1795), East Walpole, Mass.
New York Chicago Washington San Francisco
Canadian Office and Plant: Hamilton, Ont.

BIRD NEPONSET PRODUCTS



Stanley's Ornamental Surface Butts No. 165

Save Time and Labor and Please the Owner

The Ornamental leaf screws on the surface of the door, saving half the time of mortising. The slotted ball tip can be unscrewed and the pin reversed so that the butt can be used on either right or left hand doors.

The handsome, dignified **Beveled Edge** design harmonizes with the popular designs of builders' hardware. The butts are made in all finishes.

Write for booklet E describing this and many other lines of "Stanley" Quality Hardware.

TRADE S.W. MARK **The Stanley Works** TRADE S.W. MARK
New Britain, Conn.

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895

TRADE MARK

TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

adjustment. This feature, it is pointed out, permits their use both for cutting and stripping insulation, as either the narrow cutting edge can be put on the insulation or the broad stripping edge placed in contact with the wire. Each plier is accompanied by a screwdriver for adjusting the blades, which are renewable.

New Model Crescent Universal Woodworker

A machine which is of special interest to many of the readers of this journal by reason of its capacity, completeness and compact form, is the new model of Crescent Universal Woodworker illustrated in Fig. 8 of the engravings and which has been added to its already extensive line by the Crescent Machine Company, Leetonia, Ohio. The machine proper consists of five principal parts, namely, band saw, jointer, saw table, shaper and borer. These are so mounted that either of them can be used independently, as each is provided with a separate lever for starting and stopping. It is quite practical for as many as four of the principal parts or machines to be used at one time and each of the four operators can control his own machine independently of the others and without interference on some classes of work. The point is made that the band saw, jointer, shaper and borer may thus be used at the same time. The base is made of a single casting which insures stiffness and accuracy of alignment, while eliminating vibration when running. The main drive pulley, as will be seen from an inspection of the picture, is located between the band saw pulley and the shaper cones. The machine may be belted from above, from below, from the rear, or at an angle between these points. In general style the band saw is similar to the regular Crescent band saw, the handle for starting and stopping being on the front side of the machine within easy reach of the operator. The table will tilt to any angle up to 45 degrees for bevel sawing and it may be provided with an adjustable ripping fence or gauge which will be found useful for ripping lumber to bevel. The jointer is regularly furnished with a four-sided square head—two sides tapped for using the regular straight knives and two sides with T-slots for attaching special cutters. The spindle of the shaper is milled from a solid bar of steel including collar and pulley. It will take 4½ in. of knife between the grooved collars and it extends 7 in. above the table when raised, but will drop entirely below the table when lowered so as to clear the table for sawing purposes. The rear column frame work for the saw table serves also as a frame for the shaper. The saw table is made of iron and has two ways planed into it for using the adjustable cut-off fence and for other special work. The cut-off fence will tilt to any angle up to 45 degrees, right or left miter. It is fitted with a graduated brass scale to show the angle. The ripping fence or gauge will also tilt to any angle up to 45 degrees and will gauge stock up to 17

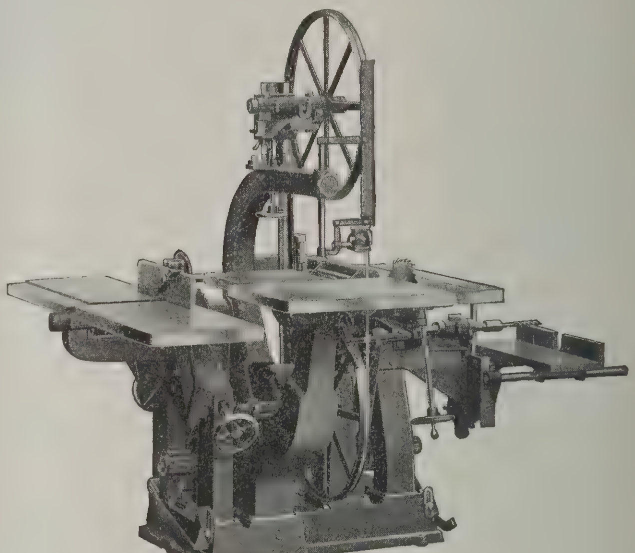
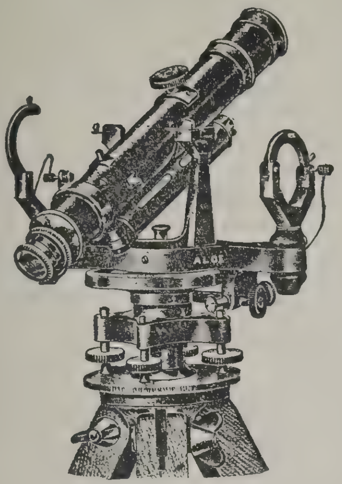


Fig. 8—New Model Crescent Universal Woodworker

(*Continued on page 80*)



Rent this Level 10 Months Then It's Yours

Builders — Contractors — Architects

This is not the old style Architect's Level. It is the newest model *convertible* level. There is not a single Builder, Contractor or Architect who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder, contractor or architect can use the Convertible Level, sent free on request.

WARNING

The Level we offer is the new Aloe Convertible Level. Don't confuse the Convertible Level with the ordinary style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified transit and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

A. S. Aloe Co., 625 Olive St., St. Louis, Mo.

COUPON

A. S. Aloe Co.,
625 Olive St., St. Louis, Mo.

Please send free instruction book on the use of the Convertible Level and complete details of your rental plan. This request in no way obligates me.

Name ....

Occupation ....

Street ....

City.................... State............

B. A., July, '14.

1 "Little Devil" = 20 Men

One "Little Devil" can mix more concrete in a day and do it better and more cheaply than twenty men can mix by hand.

If you have never used a mixer, just stop a moment and let that thought sink in.

If you are mixing concrete by hand you are losing time and more than enough money to pay for a *Little Devil* every season.

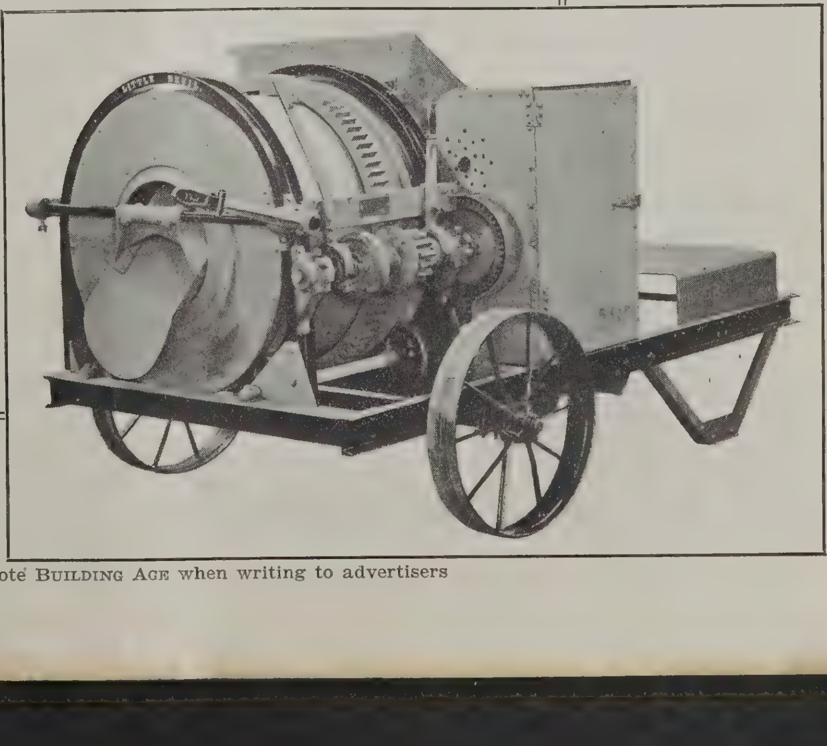
Put a "Little Devil" on the hurry-up job and see it get action. The "Little Devil" is a strong, rapid, efficient, and easily portable mixer, designed for work such as foundations, sidewalls, curbs and gutters, silos, conduits, etc., where a large volume is not required.

Don't buy a mixer until you have investigated the "Little Devil." Write today for full information.

Chicago Builders' Specialties Co.

Old Colony Building
Chicago, Ill.

Have you
a
"Little Devil"
on
The Job
?



If it's speed you want,
get a "Little Devil"
SEE THE HOIST

Make Your Buildings Fireproof and Weatherproof with

KELLASTONE
IMPERISHABLE STUCCO

The Stucco that contains no lime or Portland cement—that "gives" with the settling of buildings instead of cracking—that adheres to brick, stone or wood—that will not discolor from moisture or climatic changes and that lends itself to scores of beautiful attractive finishes on both old and new buildings.

Kellastone Imperishable Stucco is a non-conductor of heat, cold and dampness. It never has to be treated with weather-proof solutions. It reduces insurance premiums and makes a satisfied client every time.

As an interior plaster, its elasticity prevents unsightly cracks, and its hardness prevents marring when struck by furniture.

Kellastone Composition Flooring

for public buildings and sun parlors, bath rooms, kitchens, etc., in private homes, is sanitary, waterproof, fireproof and abrasion-proof. Ask for details and specifications.

Literature gladly mailed on request.

The National Kellastone Co., Room 506, Association Bldg., Chicago, Ill.

The Evolution of the Fireproof Building

The cut tells the story of how the owners of the Leavenworth apartments in Syracuse, N. Y., solved the problem of making their buildings fireproof throughout at low cost.

BERGER'S Metal Lumber

7"-4½" joists were used in the floors and roofs spaced 16' center to center, with 14'-0" spans, giving a 35 lb. per sq. ft. dead load. The joists were placed just as soon as the steel beams and columns were ready for them.

Write for our catalog today.

The Berger Mfg. Co., Canton, Ohio

For the best service address nearest branch.

New York Boston Minneapolis
Chicago Cincinnati St. Louis
San Francisco Philadelphia

in. wide. The rail upon which it slides is graduated in inches and eighths of an inch so that the fence may be set to any desired width without the aid of a rule. The table has a removable wooden throat piece, adapting the machine for grooving and other special work.

The table of the borer slides horizontally on round steel ways and stop-collars are provided to regulate the depth of holes being bored. The spindle is 1¼ in. in diameter and has a ½ in. hole to receive the shanks of the bits or the shank of the self-centering chuck which is regularly furnished.

The machine can be furnished without band saw and shaper and other attachments than those mentioned may be added, thus adapting the machine for mortising, tenoning, making moldings, grinding tools, sanding, etc. The machine is intended particularly for those users of woodworking machines who feel that they cannot afford a complete outfit of individual machines and at the same time hesitate to make the investment required for the company's No. 51 to No. 59 Universal woodworkers.

The company has just issued the 1914 edition of its catalogue of Crescent Woodworking Machinery and among the new features illustrated and described are the new model woodworker above mentioned which is brought out in 12 combinations; the company's 26 x 8 in. surfacer, which has been remodeled and changed to variable friction feed and improved fenders on its band saws. The catalogue consists of 144 pages profusely illustrated and with matter arranged in such a way as to prove of the greatest value to woodworkers generally.

Kees Siding Clips

What is said to be the "little brother of Kees metal building corners" illustrated in these columns a short time ago is the siding clip which the F. D. Kees Mfg. Company, Beatrice, Neb., has just placed on the market. The clip is used to make permanently tight and weather-proof joints where beveled lap siding on a building joins the door and window casings or corner strips. The clip consists of a piece of galvanized iron about ¾ of an inch in width. The main part of the clip covers the end of the siding while a flange fits the lower edge of the siding and another flange fits against the edge of the casing. The upper end of the clip is covered by the board and clip next above it so that a continuous water-shed is produced. One nail is driven through the clip and siding while a second goes through the side flange into the edge of the casing. The clips are made in two sizes, one being for narrow siding laid 3 in. or less to the weather, while the other size is for wide siding laid 5 in. or less to the weather. In Fig. 9 of the illustrations we show the appearance when applied of a left hand siding clip. A right hand clip is one that goes on the right hand end of a board as one stands facing the building. While the clips are made of bright galvanized iron this is said to be so treated in the process of manufacture that paint will adhere to it the same as it does to wood. The claim is made that if the building is painted when it requires it the metal will always be protected and will last as long as the structure itself. The claim is made that these clips save a great amount of labor as it is not absolutely necessary to cut the siding to exact lengths neither need the ends be squared. The joint is tight and true, and is not affected in any way by the subsequent shrinkage or swelling of the lumber.

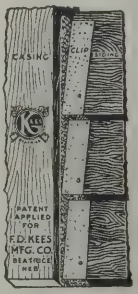


Fig. 9—Showing Application of Kees Siding Clips.

Sanitary Closets for Country Houses

In sections of the country where there is no sewer or convenient water supply it is often desirable to have a sanitary closet located in the house and it is one of the problems with which the country builders are therefore frequently confronted. In order to meet these conditions the Kaustine private sewage disposal system has been introduced by the Kaustine Company, Department G, Buffalo, N. Y. The claim is made that by the action of the powerful chemical resolvent "Kaustine," the sewage germs are destroyed and the odors elim-

(*Continued on page 82*)

IMPOSSIBLE for us to name in a few lines all of the good things we have in the way of the newest and best tools but you should know about

The celebrated Buck Brothers' Chisels and Gouges—ask for catalog No. 3199. The indispensable Jorgensen Adjustable Hand Screws—ask for circular No. 3200. The old reliable Colts Quick Acting Clamps—ask for catalog No. 3201. The genuine S. J. Addis London Carving Tools—ask for catalog No. 3202. Work Benches—ask for catalog No. 3203. Mitre Boxes—ask for catalog No. 3204.

We also carry regularly all the Yankee Tools, Stanley Rule and Level Co.'s and Miller Falls Lines, Hammond's Hammers and Hatchets, Russell Jennings' Bits, etc. You can purchase from us in one order all the best tools that the market offers. Correspondence invited.

HAMMACHER, SCHLEMMER & COMPANY
HARDWARE, TOOLS AND SUPPLIES
Fourth Avenue and 13th Street New York, Since 1848

SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.

No. 53.

A light floor or veneer Scraper with wood face to lessen friction.

A useful and convenient tool, low in price.

For full description of this and other

SARGENT WARRANTED PLANES
SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

Do You Know?

Do you know that if a level vial is drawn to a true curve the same displacement of the base will produce the same displacement of the bubble no matter at what point the bubble may be? If you haven't forgotten your mathematics, you can easily prove this for yourself.

Well, suppose you put a movable bar over the center of the bubble when it is in an absolutely level position, that will always indicate the center of the bubble when in an absolutely level position as long as the level remains true. Do you get that?

Then, if your level gets "out" all you have got to do is to place the level in an absolutely level position and move the bar to the center of the bubble. Then your level is true once more.

Every Stratton Level has this adjustment. Ask your dealer to show you some, or else write us for a catalog.

1500 Tools *Catalog Free*

Goodell-Pratt Company
Toolsmiths
Greenfield, Massachusetts, U. S. A.

inated. Proper ventilation is also provided. It is stated that high chemical and bacteriological authority in leading universities east and west support the chemical claims made for the Kaustine System, the fact being pointed out that it is accepted by the school authorities of New York, Michigan and other states and that many schools, besides scores of factories, pleasure resorts and thousands of homes have been equipped with it. The outfit is of the best materials and workmanship, the bowls being finished in either vitreous china or white enameled iron. There is said to be no danger of freezing and the cost of installation and operation are given as moderate.

Bley Adjustable Miter Gauge

A durable and accurate tool which may be carried in the pocket or the tool chest is the Bley Patent Adjustable Miter Gauge, a view of which is shown in Fig. 10, and which is being placed on the market by C. E. Jennings & Co., 71 and 73 Murray Street, New York City. It is of such a nature that all angles from No. 0 to 90 by 5 degrees may be instantly and accurately obtained on either side. By setting the trigger to 45 degrees a perfect miter may be cut on either side, right or left hand, and thus for many purposes a miter box may be dispensed with. The tool is made of steel, is machine finished and guaranteed to be accurate.

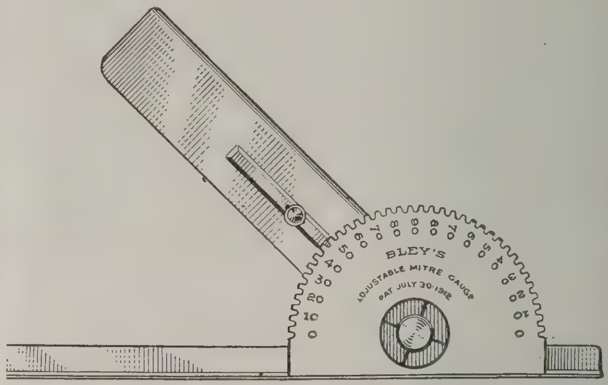


Fig. 10—Side View of the Bley Adjustable Miter Gauge

The History of the Trade-Mark "Yale"

While in process of erection we referred to a few of the more important features of the new building of the Yale & Towne Mfg. Company of East Fortieth street, New York City, and which was formally opened January 15 by a reception to the architects of the metropolitan district as well as to the clients and friends of the company. Apropos of that event the following historical reference to the trade mark of the company—the word "Yale"—may not be without interest.

The history of the firm's use of the word "Yale" as a trade mark may be said to embrace the period from 1797 to 1914 or 117 years, for it was in 1797 that Linus Yale, Sr., was born, and it was he who first identified the name "Yale" with the lock making industry by becoming the most expert and famous lockmaker of his day. The Yale bank locks and Yale night latches made by him in the '30's and '40's of the nineteenth century were marvels of ingenuity and of fine workmanship. Examples of these were on exhibition during the reception held at the opening of the new building. His son, Linus Yale, Jr., born in 1818, excelled the father in the variety and extent of his contributions to the art of lock making, and the examples of his work, especially the series of Yale bank locks which he designed and made during the '50's and '60's of the last century, examples of which were also on exhibition, were masterpieces of intricate mechanism and of perfect workmanship, although, of course, far less familiar to the general public than the many types of builders' locks of modern design also identified with the trade name "Yale" and now in use throughout the civilized world.

The trade mark "Yale," however, now applies not merely to the line of locks made by the Yale & Towne Mfg. Company, but also to builders' hardware, post

(*Continued on page* 84)

No. X2
1" 75c.
Set of 6
¼-1½", 4.25

THE L.&I.J.WHITE CO. EST. 1837 BUFFALO, N.Y. U.S.A.
L.&I.J.WHITE 1837 BUFFALO, N.Y.

No. 30
4-5" Cut $2.00

No. 20
1" 75c.
Set of 6
¼-1½", 4.25

Save Your Money

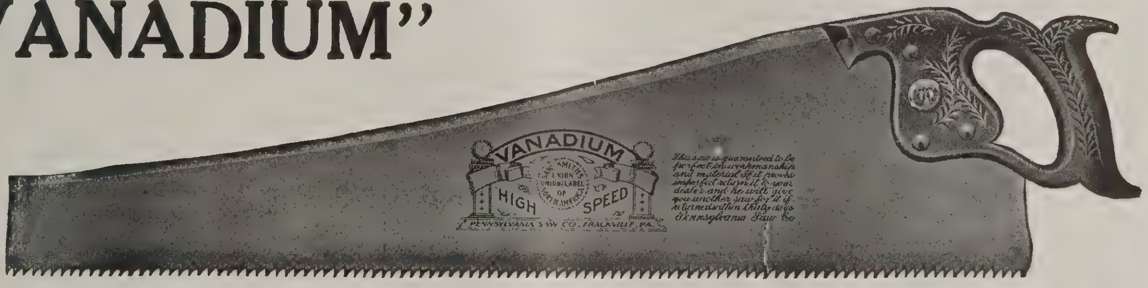
Don't waste it in buying cheap, poor tools. Our edge tools will outwear two of the cheaper kind, and think of the time you will save by not having to sharpen them half the time, and think of how much cleaner, better work you can do. We have had 77 years' experience and are acknowledged to make the very best. Insist upon WHITES'. If you have trouble getting them—send us your order.

The L. & I. J. WHITE CO., **100 Perry St., BUFFALO, N. Y.**

This Coupon Worth 75 Cents

"VANADIUM"

The King of Hand Saws


VANADIUM
HIGH SPEED
PENNSYLVANIA SAW CO. FRACKVILLE, PA.

20"	22"	24"	26"	28"	30"
$2.00	$2.15	$2.30	$2.50	$2.70	$2.90

Straight or Skew Back, in Hand, Panel, or Rip—any Teeth Desired.

Vanadium Steel Saws, made of Vanadium High-Speed Steel, hardened and tempered by a secret process, highly polished blade, extra thin back, and a finished product as a whole that cannot be excelled. Binding guarantee etched on every blade. We guarantee it superior to all other makes.

VANADIUM STEEL SAWS

For every saw ordered with this coupon enclosed deduct 75c. This is our great special offer to introduce our saws to carpenters direct.

Read—Fill In—Mail

Fill out and mail the coupon *today*. It will assure you getting, not only the most serviceable saw made, but getting it 75c. *cheaper*. In ordering more than one saw, just attach coupon to your letter.

Direct to Pennsylvania Saw Co.
Frackville, Penna.

PENNSYLVANIA SAW CO.
Frackville, Pa.

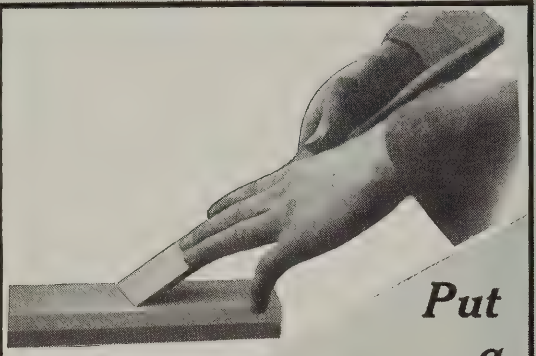
Gentlemen: I enclose $................ for your Building Age offer, for which please send me by Parcel Post, prepaid:

Length, ...ins. Teeth, ...pt. Narrow or Wide Blade, ... Straight or Skew Back, ...

It is distinctly understood that I can return any or all of these saws if they are not satisfactory after 30 days' trial, and that you will refund the purchase price upon receipt of goods.

Name..

Address...



Put a Carborundum Sharpening Stone Under Your Edge Tools

TWO or three strokes and you know that you have a stone that is different—a stone that really cuts clean and quick.—Carborundum Stones will not fill or glaze if properly used

They will last almost as long as a tool itself

Use Carborundum Stones in your workshop, in the household—wherever tools are to be kept keen and smooth-edged.

Ask your hardware dealer, or send direct for booklet giving details of the Ten Thousand Dollar Prize Business Idea Contest of the Rice Leaders of the World Association, of which the Carborundum Company is a member.

One of your business ideas may win one of the big cash prizes

THE CARBORUNDUM COMPANY
NIAGARA FALLS, N. Y.

BY INVITATION MEMBER OF
RICE LEADERS OF THE WORLD ASSOCIATION
NEW YORK U.S.A.

office boxes, chain blocks, electric hoists and practically all of the wide range of products made by the company and most effectively displayed in the beautiful exhibit rooms on the ground floor of its new office building.

Cost of Van Guilder Hollow Wall Construction

Some decidedly interesting and valuable information relative to the cost of hollow wall concrete construction as compared with other commonly used materials is contained in an attractive pamphlet just issued from the press by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y. The little work bears the title "Concerning Costs" and in it two methods are given of estimating the cost of outside walls of a house built by using the Van Guilder hollow wall machines. Detailed figures are presented covering the cellar of a typical house of which the plans are shown; the superstructure, the footings, the total amount of concrete required for the house, the labor involved, allowances, etc. The same process is followed in connection with estimating the cost of hollow concrete cellar walls for a frame house and for estimating the cost of a double wall silo. The point is made that a wooden silo may blow down any day after it is erected and if it does not meet that fate it will rot out in the course of 15 or 20 years, whereas on the other hand the Van Guilder concrete silo when once built will never blow down. It will require no attention to keep it in commission; fire cannot destroy it; the ensilage will not freeze, and "it will stand for ages as a monument to the good judgment of its builder."

Shelby Broad Bevel Sash Lift

A specialty which has just been added to their already extensive line of builders hardware by the Shelby Spring Hinge Company, Shelby, Ohio, is the new broad bevel flush sash lift, a front view of which is presented in Fig. 11. The broad beveled edges give it a rather massive appearance while the wrought steel, bronze or brass in which it is made and finished to match any interior hardware, renders it exceedingly durable and attractive. This specialty has been brought out to meet the demand for a high class sash lift.

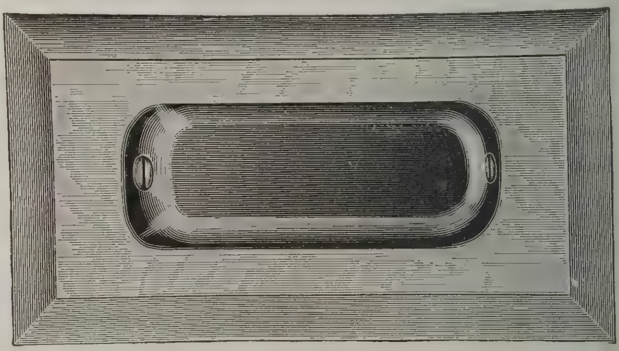
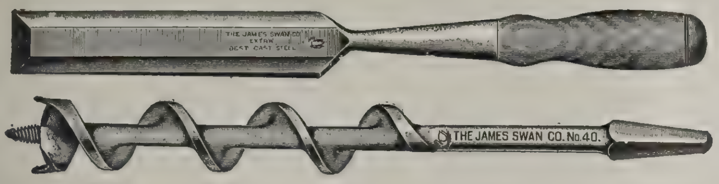


Fig. 11—The Shelby Broad Bevel Sash Lift

The Smith "Hot" Mixer

What is described as "a remarkable asphalt patching plant" which makes old asphalt new and which is especially adapted for asphaltic concrete is the Smith "Hot" mixer illustrated and described in a folder printed in colors which is being sent out to the trade by the T. L. Smith Company, 3120 Hadley Street, Milwaukee, Wis. This mixer consists of the Standard Smith mixer mounted on a truck with steam engine and boiler equipped with side loader having the following parts added to convert it into a hot mixer. The capacity of the boiler plant is increased and a steam blower added so as to force the hot air and gas from the fire box through the long asbestos lined hot pipe which runs from the boiler to the discharge end of the drum. The only other additional feature is the tar tank which is mounted on the loading skip. The machine has proven very successful throughout the country, especially for patching purposes. Installations have

(*Continued on page* 86)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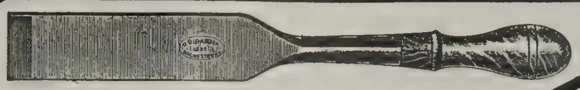
LOOK FOR THE "SWAN" TRADE MARK

On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.



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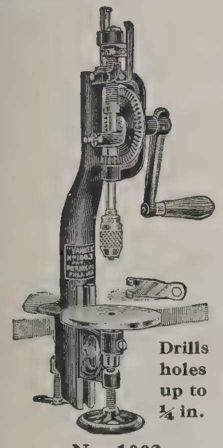
The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

D. R. BARTON 1832 ROCHESTER, N.Y.

Brown's Race
Rochester, N.Y.


Drills holes up to ⅜ in.

No. 1003

You use but one hand to operate the

"YANKEE" Bench Drill

With the new automatic features the friction feed brings the drill down quickly to the work, then the ratchet feed operates and prevents breaking of the drill point. This leaves free use of the left hand to hold the work. The quickest and most convenient Bench Drill Made.

Send for the "YANKEE" Tool Book

NORTH BROS. MFG. CO.
Lehigh Avenue PHILADELPHIA, PA.

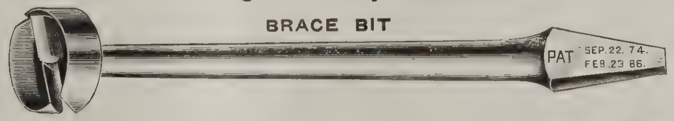
Two Speeds
Drills holes up to ½ in.

No. 1005

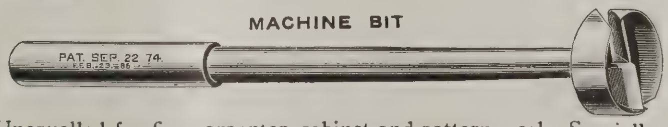
THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.

BRACE BIT


PAT SEP. 22. 74. FEB. 23. 86.

MACHINE BIT


PAT. SEP. 22. 74. FEB. 23. 86.

Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

Reynolds Asphalt Shingles

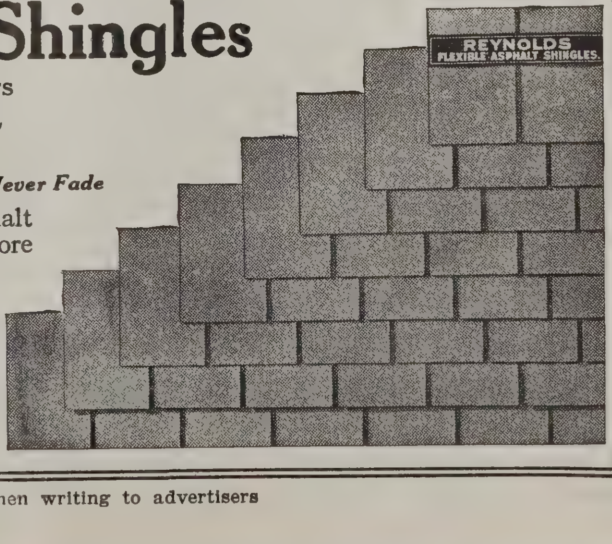
ENDORSED BY LEADING ARCHITECTS

GUARANTEED FOR 10 YEARS—WILL LAST MANY YEARS LONGER

Natural Colors of Garnet, Red, Gray and Green, Which Never Fade

We are the ORIGINAL MAKERS of Flexible Asphalt Shingles and tested our product for ten years before putting it on the market. Let us send you a booklet.

H. M. Reynolds Asphalt Shingle Co.
West Grant Street Grand Rapids, Mich.
Established 1868


REYNOLDS FLEXIBLE ASPHALT SHINGLES.

Stanley Doweling Jig

A new and most unique tool that will enable the user to bore dowel holes in the edge, end or surface of work with the greatest ease and with absolute accuracy.

A tool that will immediately commend itself to Carpenters, Cabinet Makers, Pattern Makers,—in fact to every artisan or amateur who has occasion to do any kind of doweling.

A postal brings you a special circular containing complete description and showing various forms of work in which the Jig will be found of great assistance.

Address

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

Reg. U. S.
Pat. Office

The Disston Standard of Quality Applies to Every One of Their Products

From the beginning, 74 years ago, a high standard was set for Disston Brand Goods. This standard has been raised to keep pace with the advance of the times. So high is this standard that both dealers and mechanics have come to look upon a Disston Saw or Tool as the standard by which to judge all others.

Henry Disston, himself a finished mechanic, insisted upon sending his sons into the shop to learn the business as he did. Realizing the importance of this early training, his sons in turn placed their sons in the shops until they thoroughly understood the manufacturing end of the business.

This means that the sons and grandsons of Henry Disston, who today manage the great business which he established, are all practical men. They know the business from the ground up, which assures a maintenance of the efficiency and high quality of all products manufactured by the Disston Works.

HENRY DISSTON & SONS
Incorporated
Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, U. S. A.

been made with a great many municipalities where it is stated they have cut their costs in half for the repairing of asphaltic concrete and tar macadam. The particular saving is effected through the fact that the old tar macadam or asphaltic concrete can be torn up from the street, thrown into the machine and remelted, a small amount of new bitumen added and the resulting mixture re-laid on the street. We understand from the company that it will gladly send a copy of this booklet to any reader who may request it.

Addition to "Standard" Mixer Line

Another distinctive feature which is likely to be greatly appreciated by contractors having occasion to mix concrete has just been added to its already popular line of machinery by the Standard Scale & Supply Company, 243 and 245 Water street, Pittsburgh, Pa. It consists of a removable discharge hopper, an illustration of which appears in Fig. 12 of the engravings. In operation the removable discharge hopper is placed so that the entire batch can be discharged from the drum into the hopper. Then the wheelbarrows are loaded from it, while another batch is being mixed. The hopper holds more than one batch of concrete so that the delays in placing concrete in "forms" by the wheelers will not create a delay in the mixing process. Work can, therefore, be rushed to a maximum output by increased speed of the workmen at the charging and also at the distributing ends of the mixer. A door is provided in the hopper end and by operating it the concrete flows into the wheelbarrows. This enables the latter to be charged with any quantity desired. The hopper can be folded up against the drum in cartage and removed when discharging into wheelbarrows or when discharging into forms or hoisting elevators. The statement is made that all the "Standard" low charging mixing machines can be equipped with the hopper at a slight extra cost. It can be furnished to the present owners of the machines by being mounted on four legs, as it is not necessary to attach it to the truck frame, although this can be done if desired. The removable discharge hopper is constructed of sheet metal and is of the usual sturdy design characteristic of the "Standard" mixers. One of the largest contractors of foundations in the country after trying one of these devices ordered all of the remainder of its machines equipped with it. In this device contractors will appreciate the fact that it is not in the material used but in the use of economical machinery that the greater profits are made. Any reader of *The Building Age* who so desires can secure on application to the address above given a copy of the company's catalogue No. 487 which gives additional data relating to the "Standard" removable discharge hopper.

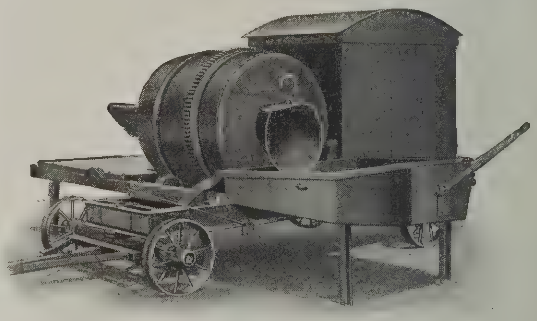


Fig. 12—The addition to the "Standard" mixer line

◆

"Recommended Practice and Standard Specifications for the Construction of Concrete Roads and Pavements" is the title of a pamphlet which is being distributed by the Universal Portland Cement Company. The practice for road building is that adopted by the National Conference on Concrete Road Building held early in the year in Chicago, while the proposed standard specifications are those of the American Concrete Institute for the construction of "one course concrete highway," "one course concrete street pavement" and "two course concrete street pavement."

Pearson's Automatic Shingle Nailer

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only **$5.00** It makes good.

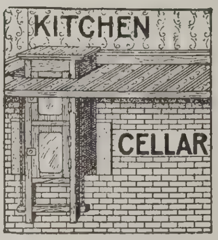
Pearson Mfg. Co.
Robbinsdale, Minnesota

ELEVATORS for Many Purposes
Elevate Your Business with the
"BLAKE ELEVATOR"

Hand Elevators
Belt Power Elevators
Dumbwaiters
Invalid or House Elevators

State your requirements and an interesting proposal will promptly come.

Blake Elevator Mfg. Co., Sidney, Ohio



CARPENTERS WANTED AS AGENTS During Fall and Winter Months. Big Money; Ready Seller.

Sanitary Automatic Dumbwaiter

saves carrying food to and from the cellar. Perfectly ventilated; screened openings; finished inside with durable white enamel. Keeps food perfectly. Top lies flush with kitchen floor. You can walk over it. Operates with push button or lever. Also furnished as a Refrigerated Dumb Waiter. Write for Particulars and Price.

York Automatic Dumbwaiter Works
641 W. Market St., York, Pa.

SEND $1.00
for this
remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending $1.00 for this attractive offer. We prepay postage.

Otis A. Smith Rockfall, Conn.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS AND DUMB WAITERS
Automatic Hatch Gates
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KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
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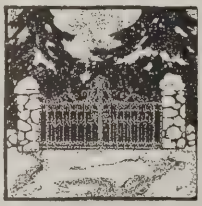

YOU cannot insure structural steel and iron against corrosion and decay but you can specify

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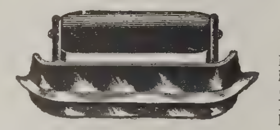
—it's the same thing. Booklet No. 32-B.

Made in Jersey City, N. J.
Joseph Dixon Crucible Co.
ESTABLISHED 1827

Something For You

in our Pamphlet 29; viz:
Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.
Some of these Tables are not in print elsewhere.
The Pamphlet and a Mounted Model Hanger will be mailed on request.
SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.



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To introduce our line of "Mirror Finish" Cement Tools, we will deliver to your door, transportation charges paid by us,
No. 1 Mirror Finish Jointer for 50c.
No. 18 Mirror Finish Edger for 50c.

Joseph Woodwell Co., 201 Wood St., Pittsburgh, Pa.

LARGEST DEALERS in Bricklayers, Masons and Plasterers Tools in the U. S. Our No. 7 Catalogue is now ready. Send for Copy.

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Young Men of good character engaged in the trades are in demand as teachers of Practical Arts. This department affords exceptional opportunities for training such teachers.
Our **Apprenticeship Student System** is distinctive. Graduates are in demand. Year begins September 21st. For particulars address

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Director of Department of Mechanic Arts.

RED DEVIL BITS
Single or Double Twist

Honed Like a Razor, Not Simply Ground, But Trued on a Lathe

Red Devil Bits are made with 10% greater clearance than any other. Will bore with or against the grain, in any kind of wood, and under any conditions.
If your dealer can't supply, send $5.25 for set No. 2401 of 32½ quarters in wooden box.
At any rate, send for Booklet of 3,000 Red Devils.

SMITH & HEMENWAY CO.
158 Chambers St., NEW YORK CITY
The Red Devil Bit—Always Makes a Hit

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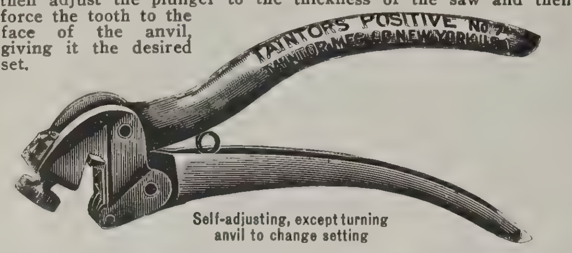
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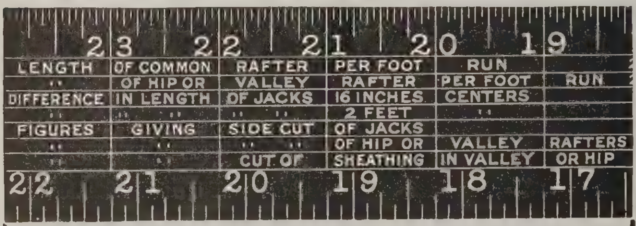
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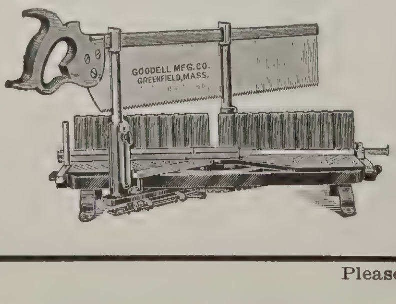
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TRADE NOTES

In connection with the description of inexpensive cottages for workingmen erected at Hanover, Mass., for the E. H. Clapp Rubber Company, which appeared on page 31 of our June issue, the statement should have been added that the stucco exteriors were treated to an application of Bay State Brick and Cement Coating made by Wadsworth, Howland & Co., Inc., Boston, Mass. This coating was used with good effect and added materially to the attractive appearance of the completed cottages.

The garage door problem occupies a large percentage of the space devoted to editorial comment in the April issue of "DooR-Ways"—the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill. The phase of the problem considered is the "Hanging of Full Front Sliding Doors on Small Garages," and the article is from the pen of E. J. G. Phillips, the engineer of the company. The article is illustrated by means of numerous sketches and there are also half tone illustrations of garage doors hung with the company's hardware. One of the interesting features of the issue in question is a brief description of the carpenter's hinge gauge made by the company, and also its steel folding builders' bracket.

Half-tone engravings of several buildings covered with J-M asbestos roofing are features of the June issue of the "J-M Roofing Salesman," the house organ of the H. W. Johns-Manville Company, Cleveland, Ohio. The buildings represented include bungalows, dairy barns, cattle barns and the plan of the Cleveland Heater Company. The bungalows were erected in Colorado Springs, Col.

The general sales offices of the Trussed Concrete Steel Company were on June 1 removed from Detroit, Mich., to Youngstown, Ohio, where the company's plant is located. We understand the prime object of the change is to secure greater efficiency through closer cooperation of all departments.

What Moore Brothers of Jamestown, N. Y., have to say in another part of this issue about files and the speed with which the workmen wear them out is likely to attract more than passing attention. They raise the question "Why not try a file that is made from a superior brand of steel by practical, skilled file cutters?" They emphasize the durability of their XX taper files and economy of their cost to the mechanic.

Robert L. Ingersoll, architect and builder, 123 Washington street, South Norwalk, Conn., desires to receive from manufacturers copies of their latest catalogues and samples of building materials.

A catalogue of 40 pages issued by the Frantz Mfg. Company, Sterling, Ill., shows the leading lines of hardware which it is prepared to furnish. Special attention is directed to door hangers and tracks of various kinds, steel stay rollers; door stops; sliding door latches; sash hangers, storm window ventilators, etc. The matter is presented in a way to render the salient features readily understood and a copy of the catalogue will be sent to any architect or builder who may make application for it.

C. W. Boynton, for the past ten years inspecting engineer of the Universal Portland Cement Company, 208 South La Salle Street, Chicago, Ill., has resigned his position to take charge of construction work in connection with the development of its properties in California by the Sonoma Magnesite Company. It is announced that W. M. Kinney, assistant inspecting engineer, who has been in charge of the Inspection Bureau of the Universal Portland Cement Company in Pittsburgh during the past six years, will take up the work which Mr. Boynton leaves.

(*Continued on page* 90)

—and huge condensed milk plants also find 5-ply UTILITY best!

THE Chapin-Sacks Co., of Washington, D. C., with condensed milk factories in Michigan, Indiana, New York, Pennsylvania, Illinois and many other parts of the country, use thousands and thousands of square feet of UTILITY—the only 5-ply wall board.

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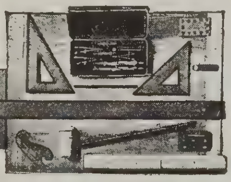

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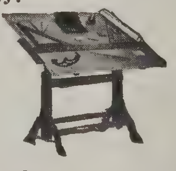

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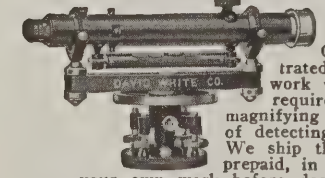

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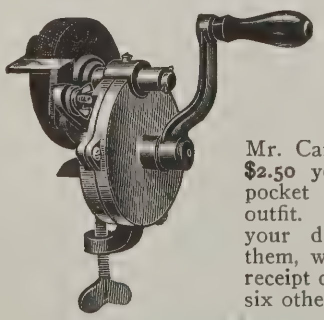

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Announcement is made that Dudley A. Johnson succeeds the late Sam Mayer as manager of the Chicago branch of the Joseph Dixon Crucible Company, Jersey City, N. J. Mr. Johnson was for a number of years assistant to Mr. Mayer at Chicago and he brings to his new position the knowledge acquired by the experience of many years acquaintance with the Dixon line and the Dixon customers. In the June issue of *Graphite* it is stated that Mr. Johnson went with the Joseph Dixon Crucible Company in 1898, bringing with him experience in the lead pencil and stationery business, which he had acquired with P. F. Pettibone & Co. and the Holyoke Envelope Company. During the first few years with the Dixon Company he had charge of the lead pencil department and the school work; later he assumed charge of the crucible and black lead department of the company in the Chicago territory and is therefore fully equipped to ably represent the Dixon Company as its branch manager in that section.

A feature of the *Saturday Evening Post* of June 20 was a page advertisement, a fac-simile of which appears in another part of this issue, of a Neponsit playhouse of the old New England Colonial type which Bird & & Son, of East Walpole, Mass., offer to deliver to any address all ready to put together for practically a nominal sum. It is sent in sections for safety in shipping. The house is made of Neponset products and is a symbol of the maker's business which is the manufacture of shingles, waterproof building paper, roofings, and wall board all under the trade name Neponset. The high quality of Neponset products is so well known among carpenters, builders and contractors that Bird & Son believe that the playhouse in question will be the means of increasing this reputation with the public at large and especially with those who are buildin at the present time.

The foundations for the new plant of the Universal Portland Cement Company, which is under construction at Duluth, Minn., are now practically completed. The machine shop and store room are ready for occupancy; the structural frame for raw material bins and building as well as coal bins and trestles are completed and the contract work on the cement stock house will soon be under way.

From the offer made in another part of this issue by the Ethical Culture School, 33 Central Park West, New York City, it is evident that educational institutions are becoming more and more practical in their methods of instruction. Here we have an apprentice student method applied to the training of teachers which is somewhat comparable to what is found in many cities of the country where the co-operative shop and school plan of trade teaching is instituted. In previous methods of training workmen there has not been enough of the student element and in the training of teachers perhaps there has been some lack of real apprenticeship to the teaching art. There are no doubt many mechanics who would do well to go into teaching which has much to say for it as a vocation—to the right kind of men. It is after all the business of building human nature; in this case bricks, mortar, timber, etc., being instruments rather than materials to this end. Those who would undertake to become teachers would do well to ask themselves if they are interested in human nature and are especially fond of boys and would take some interest in their growing up to be useful men. It takes a good piece of human nature to make a good mechanic and it will take good mechanics to make more good mechanics.

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THE BUILDING AGE

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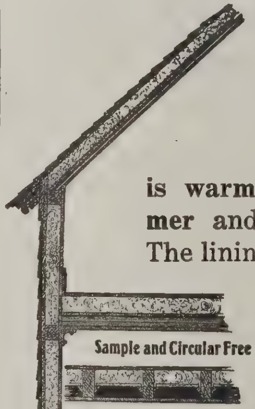

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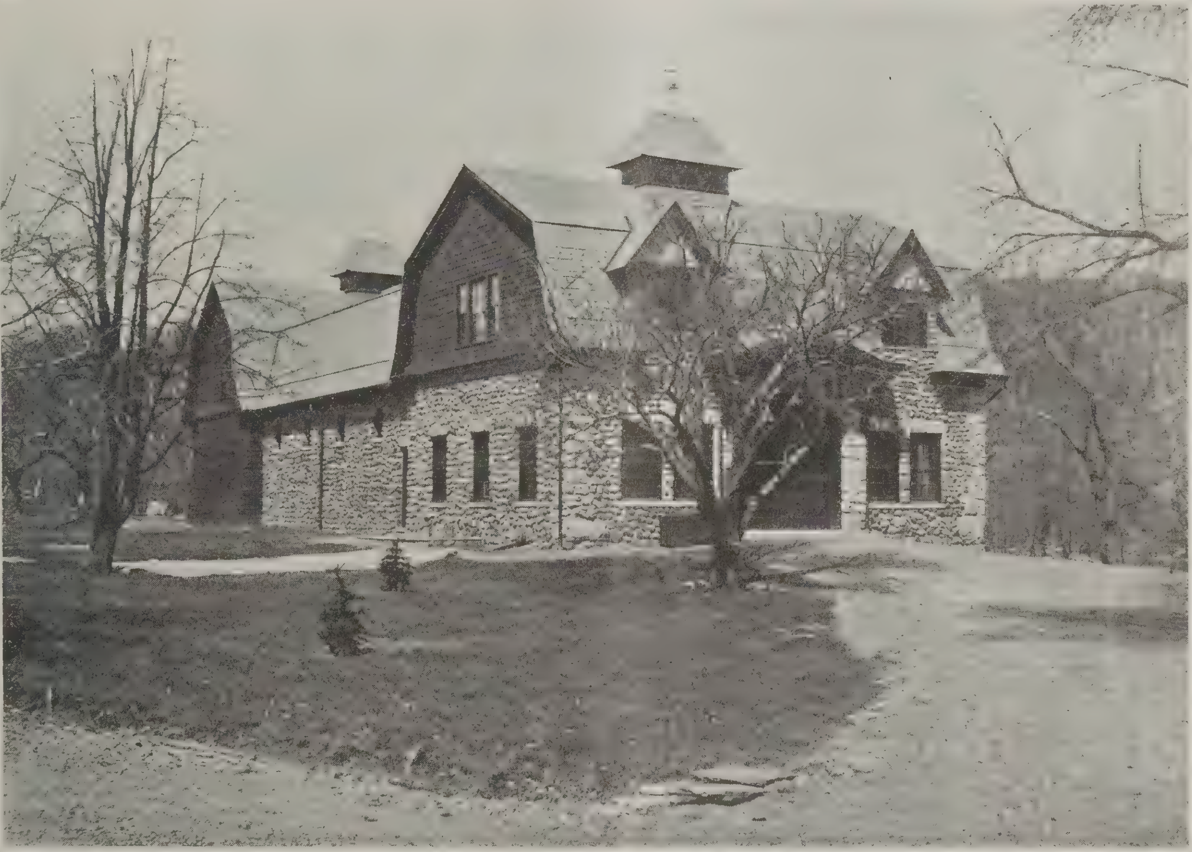
THE BUILDING AGE

NEW YORK, AUGUST, 1914

A Modern Carriage House and Stable

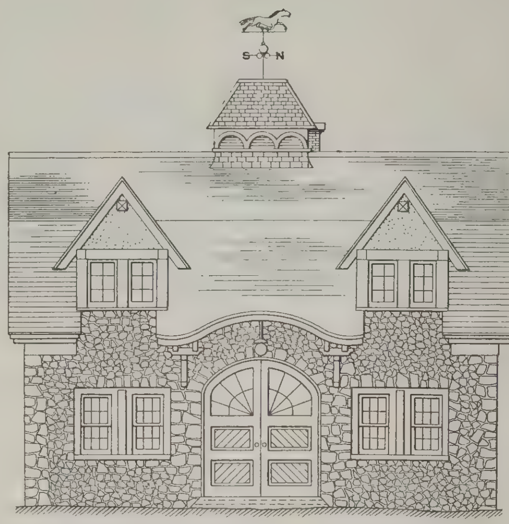
Field Stone Used with Good Effect—Figures of Cost—Living Rooms for Coachman a Feature

An excellent example of the use of rubble or field stone for the foundations and first story of a building is seen in the carriage house and stable which is illustrated and described in this article. The half-tone engraving shows to good advantage the appearance of the finished structure, while the interior picture, on another page, is a view in the carriage room looking toward the old stable which is of frame construction throughout, and is shown in the background of the large picture. The floor plans indicate the division of the space on the main floor and also show the living quarters of the coachman and family who occupy the second story at the front directly over the carriage room.

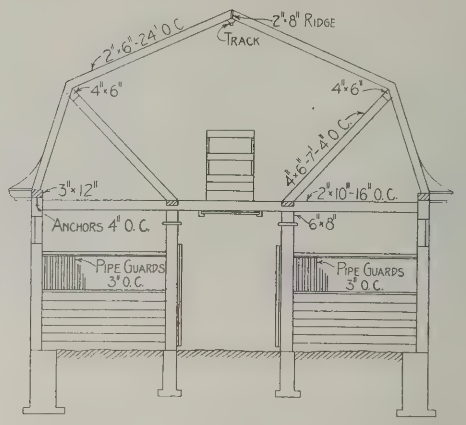


The Carriage House and Stable of Mr. William Crawford on Glen Lea Farm, Near Monroe, N. Y.—Architect, W. I. Hall, Monroe, N. Y.

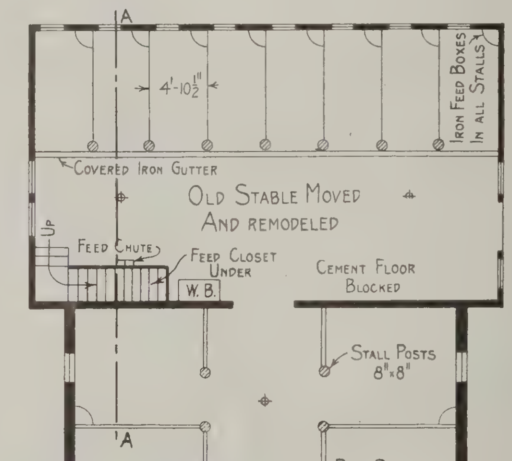
The concrete footings are 6 in. deep and project 6 in. on each side of the foundation walls, which are of field stone laid up in cement mortar. The



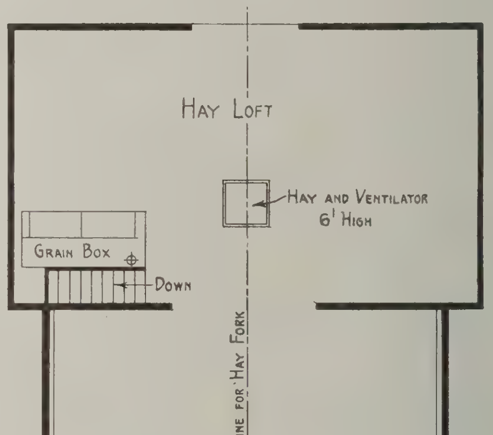
Front Elevation of the Building—Scale 1/16 In. to the Foot



Cross Section of the Building Taken Through the Box Stalls—Scale 1/16 In. to the Foot



Main Floor—Scale 1/16 In. to the Foot



Second Floor—Scale 1/16 In. to the Foot

A Modern Carriage House and Stable—Plans, Elevation and Vertical Cross-Section first-story walls, where shown in the picture and on the elevations, are of rubble stone laid with natural face, while the trim around doors, windows and at the corners is of white quartz. The joints were well cleaned and wiped out with a stiff brush before the cement was allowed to set. All windows in the stonework have 4-in. cement sills.

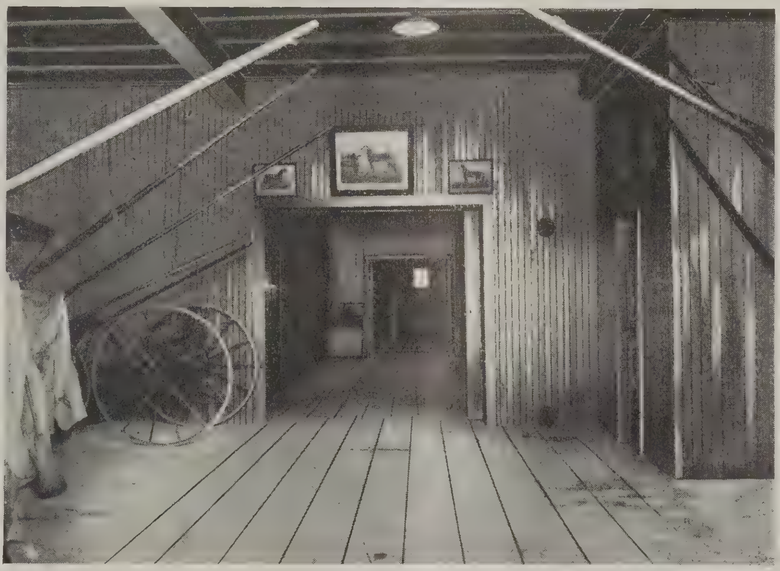
The roofs are sheathed with shiplap, over which heavy building paper was laid and this in turn covered with asbestos Indian red 6 x 12-in. slate as made by the H. W. Johns-Manville Company. The gables in the roof are covered with 18-in. Washington red cedar shingles laid $5\frac{1}{2}$ in. to the weather. Under the shingles are building paper and sheathing boards.

The two dormers in the front elevation of the carriage house are plastered on wire lath and finished with pebble dash.

The chimney is of hard burned brick with 8 x 8 terra cotta flue lining.

The cellar floors consist of 4 in. of concrete on which is a finish coat $\frac{3}{4}$ in. thick of sand and cement in the proportion of 1 to 4.

Where the "wash way" is shown in the carriage room the 4 in. of concrete rests on a bed of broken stone and has a finish of $\frac{3}{4}$ in. of screened sand. There is a depression of 12 in. in the center which is provided with bell trap connecting with overflow.



A Modern Carriage House and Stable—View in Carriage Room

The carriage room and stable floors are laid on steel I-beams, as indicated on the foundation plan, with $\frac{3}{4}$ in. stay rods every 3 ft., and consist of 4 in. of cinder concrete reinforced with Pittsburgh welded reinforced fencing. The floors are finished with $\frac{3}{4}$ in. of sceened sand and cement left under float. The passage between the stalls is filled in with broken stone and cemented the same as just described. The surface is scored to prevent slipping.

The front doors are of 2-in. North Carolina pine glazed with wire glass and hung on Lane's tubular track. All other outside doors are of 2-in. North Carolina pine with $\frac{7}{8}$-in. panels and are hung on heavy cast hinges. The windows are hung with iron weights and the stall sash are hinged at the bottom, while the cellar sash are hinged at the top.

The beams in the carriage room are of North Carolina pine 4 x 10 in. in size and placed 16 in. on centers. The beams are surfaced and have the lower corners chamfered. They are carried on the steel I-beams with 3 x 4-in. oak bracket bolted to them every 3 ft. with $\frac{3}{4}$-in. bolts. The floor is of $\frac{7}{8}$-in. North Carolina pine covered with heavy felt, on which is laid $\frac{7}{8}$-in. spruce. The stall posts are 8 in. in diameter and the floors of the stalls are made of oak slats $2\frac{1}{2}$ x 4 in. bolted together with iron rods with $\frac{1}{2}$-in. iron washers between each slat. All floors are so secured as to be easily removable. The floor over the stalls is of $\frac{7}{8}$-in. North Carolina pine.

All box stall doors are of the sliding type and operate on Lane's tubular track made by Lane Bros., Poughkeepsie, N. Y. Pipe guards extend 3 ft. above the stall partitions, use being made of $\frac{1}{2}$-in. pipe with 2 x 4-in. cap pieces.

The hood over the front door is covered with 16-oz. sheet copper with soldered joints. The building is fitted with ogee copper hanging gutters and 3-in. square leaders.

The second story over the carriage room is finished with Peerless plaster board and treated with lime skim using White Rock plaster. All trim in the rooms on the second floor is of white pine with plain casings, base, etc., and with $\frac{1}{2}$-in. quarter round at the floor. All doors are of the four-panel ogee type hung on loose pin butts. Shelves and clothes hooks are provided in the closets on this floor.

The interior woodwork is treated to one coat of Rex filler and two coats of Pierce's spar varnish.

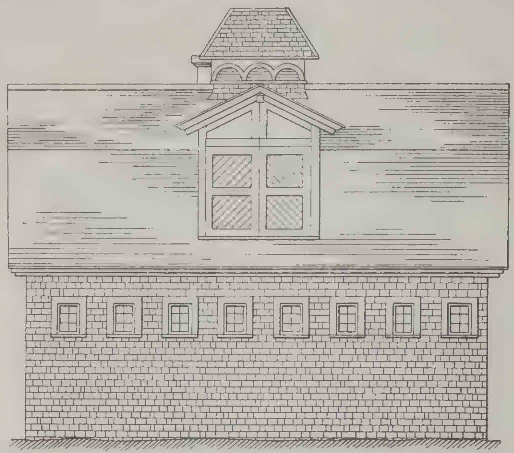
The toilet is fitted with a Centurian water closet with low down tank and having all the necessary connections. It is connected with cesspool by a 4-in. cast iron soil pipe with fresh air inlet and running trap. The toilet is also fitted with a small enameled lavatory. The water supply connection is through a $\frac{3}{4}$-in. galvanized pipe. The enameled sink in the kitchen on the second floor is 15 x 30 in. and connects with water supply same as through fixtures.

The building was designed and erected under the supervision of W. I. Hall, architect and builder, Monroe, N. Y., and was finished in 1912 for William Crawford of New York City on his "Glen Lea" Stock Farm about three miles north of Monroe.

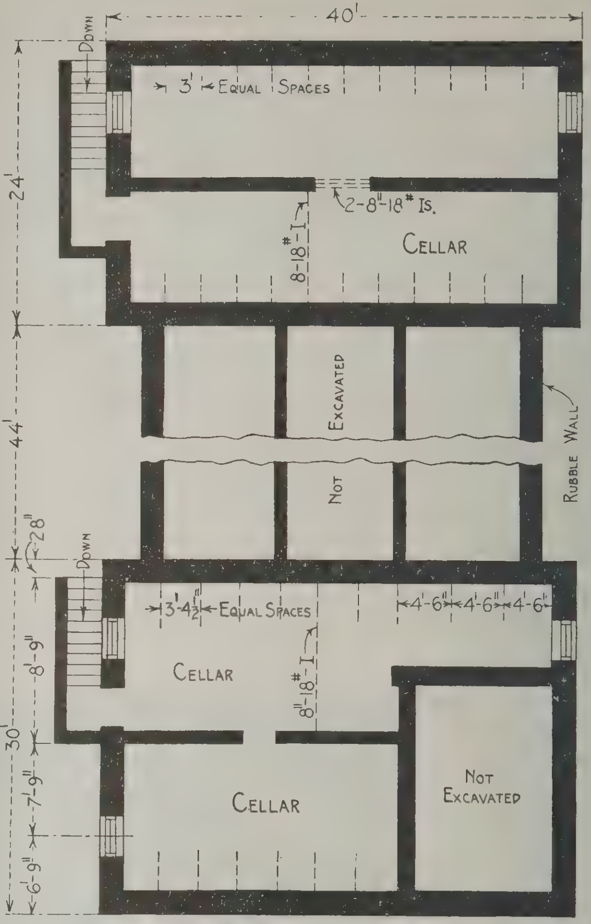
Important figures of cost are as follows:

Excavating	$150
Stone work and cement	1,000
Concrete work and reinforcing	500
Carpenter work, lumber and carting	4,750
Electrical work, but not fixtures	100
Copper work, hood roof, etc	300
Iron work	350
Plumbing	250
Painting	250
Plastering work	150
Asbestos slate roofing	1,200

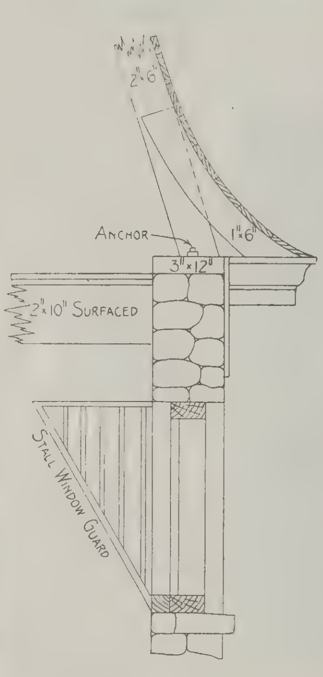
The contractor was W. B. Tench of Monroe, N. Y., who states that the plastering (hard finish) is figured at 50 cents per yard and rubble work at 15 cents per cubic foot. The cost of the building was approximately $9,000.



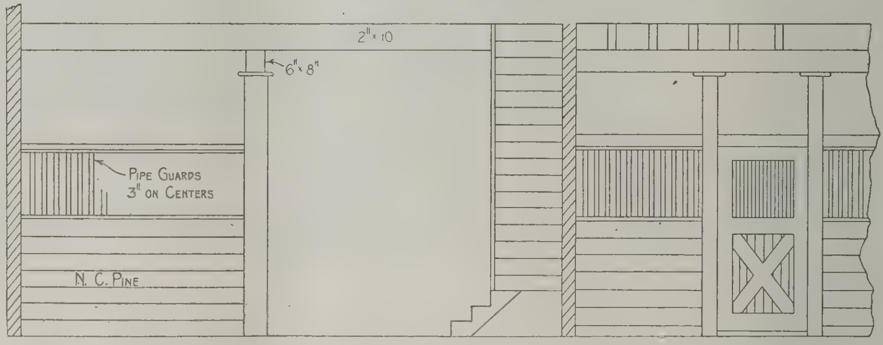
Rear Elevation of the Old Barn, Showing Windows Lighting the Stalls—Scale 1/16 In. to the Foot



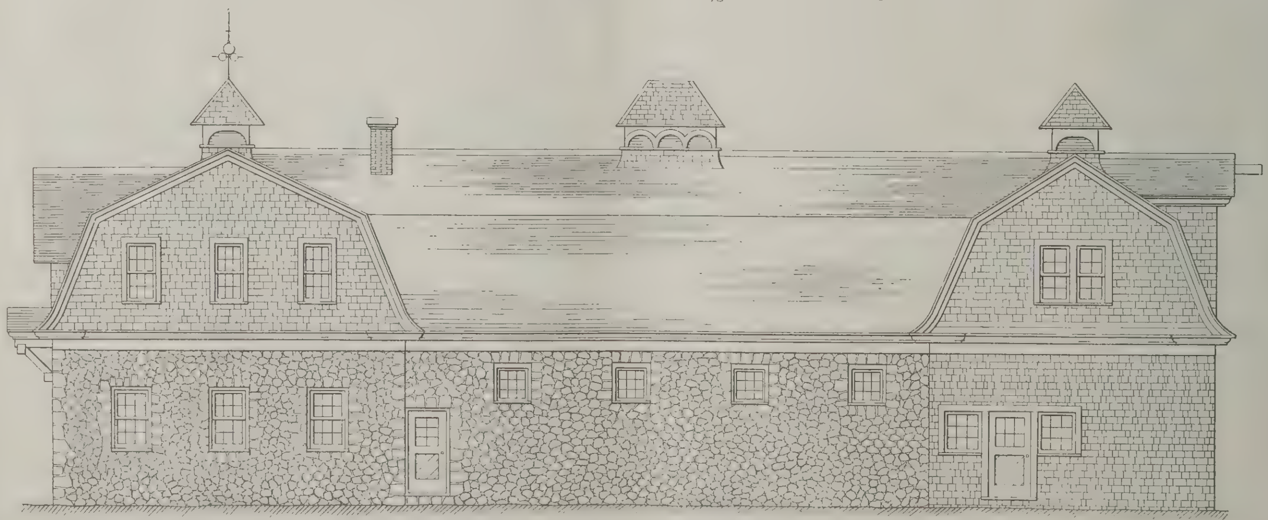
Basement Plan—Scale 1/16 In. to the Foot



Detail of Main Cornice—Scale ⅜ In. to the Foot



Vertical Cross Section Through Old Stable at Rear on Line A-A of the Plan—Scale ⅛ In. to the Foot



The North or Right Elevation—Scale 1/16 In. to the Foot

A Modern Carriage House and Stable—Plan, Elevations and Details

Estimating Cost of Carpentry Work

What a Man of Many Years' Experience in the Building Business Has to Say on This Important Subject

By Leslie H. Allen

IN the course of many years' experience in purchasing and estimating the cost of mill work and other carpentry, it has been a matter of some surprise to the writer to find that there are no units of measure established by which doors, windows and other finish can be valued. The universal practice in this country is to estimate the cost by methods which savor of guesswork. There is no attempt to value work by unit prices. The builder estimating the cost of the window shown in Fig. 1 would probably put down $9 for the frame and sash, $3 for the trim and staff beads, $3 for the glass, $3 for all labor in setting frame, jointing the sash, fixing the trim, etc.; total, $18 per opening. If the opening were larger he might make it $20, but these prices would be put down regardless of any measurement or of any units of cost. An estimator of wide experience may get costs surprisingly accurate, but if they are little more than guesswork he is bound to get into trouble sooner or later. The mason has his unit of thousands of brick, concrete is estimated by the cubic yard, plastering by the square yard, and so on, but mill work has no unit in common use.

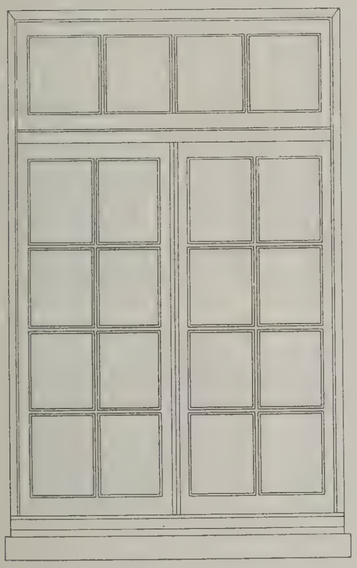


Fig. 1—Elevation of Window—Scale ⅜ In. to the Foot

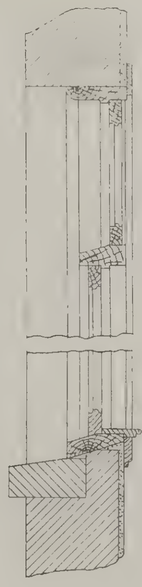


Fig. 2—Vertical Section—Scale ½ In. to the Foot

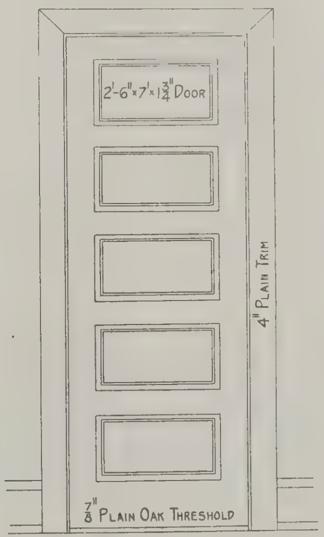


Fig. 3—Elevation of Door—Scale ⅜ In. to the Foot

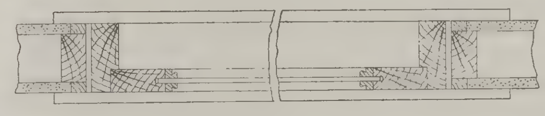


Fig. 4—Horizontal Section of Door and Frame—Scale ¾ In. to the Foot

Estimating Cost of Carpentry Work

For some years past the writer has used a method of estimating that eliminates a good deal of this guesswork and yields results that seem surprisingly accurate to those who estimate along the old lines. It is hoped that this may be of use and that some discussion may follow that will bring out the good and bad features of this method, or outline a better one for general use. It does not seem creditable to the contracting business that there should be no definite method of estimating mill work, and the establishment of some such method is to be greatly desired.

If in the near future the much discussed Quantity System is adopted here, some method of measuring and describing mill work will be needed, and it is believed that this plan will prove far better than any method of simply counting openings and describing them with sketches, which seems to be the only possible way at present.

Taking first a window, measure the frame in lineal feet, including transom bar and sill (measuring each member its entire length to allow for tenons). Then take the sash in square feet, noting the thickness and the average size of the lights. Next take the glass, also in square feet, and then the trim to top and sides in lineal feet, giving size of pieces; then the stool and apron, each in lineal feet in a similar way, and also the outside staffbead. Follow with the labor of setting frame, caulking sill and jointing sash and fixing trim and staffbead.

To illustrate, take the window shown in Fig. 1

of the sketches. According to this method it will be found to contain the following items:

28 lin. ft. 6″ x 2½″ frame, transom bar and sill	@ .20	$5.60
27 sq. ft. 1¾″ sash (in lights 10″ x 14″ and 12″ x 14″)	.12	3.24
23 sq. ft. double thick Am. clear sheet glass	.14	3.22
20 lin. ft. 4″ x 1″ plain trim	.06	1.20
5½ lin. ft. 5″ x 1″ window stool	.07½	.41
5½ lin. ft. 4″ x 1″ apron molding	.06	.33
19 lin. ft. 1¼″ outside staffbead	.04	.76
No. 1 labor on setting frame and caulking sill	2.00	2.00
No. 3 labor on jointing sash and fixing hardware	.30	.90
No. 1 labor on trim and staffbead	.30	.30
Total cost per opening		$17.96

In a similar way the door shown in Fig. 2 will be found to comprise:

17½ sq. ft. 1¾″ 5-panel door, the panels molded both sides	@ .25	$4.25
17½ lin. ft. 6″ x 2½″ rebated frame	.20	3.50
No. 1 rough buck to door frame	1.50	1.50
36 lin. ft. 4″ x 1″ plain trim	.06	2.16
2½ lin. ft. ⅞″ oak threshold	.10	.25
No. 1 labor setting frame, hanging door, fixing hardware, trim, etc	4.00	4.00
Total cost per opening		$15.16

It may seem at first sight that this makes a very large amount of work to be gone through to obtain the price of one opening, but it must be borne in mind that if 100 doors or windows of different sizes were taken off in this way their component items could be added together and reduced to eight or six lines of writing *without sketches* and priced on a definite basis. For instance, if a building had twenty windows, of which fourteen were similar to Fig. 1, two of them the same size but having no transom, and four being only five feet high with no transom, the quantities for the whole twenty could be computed and added together as follows:

507 lin. ft. frame, etc	@ .20	$101.40
505 sq. ft. 1¾″ sash	.12	60.60
430 sq. ft. Am. double thick glass	.14	60.20
272 lin. ft. 4″ x 1″ trim	.06	16.32
107 lin. ft. 5″ x 1″ window stool	.07½	8.03
105 lin. ft. 4″ x 1″ apron molding	.06	6.30
No. 20 labor setting frame and caulking sill	2.00	40.00
No. 54 labor jointing sash and fixing hardware	.30	16.20
No. 20 labor on trim and staffbead	.30	6.00
Total for the twenty openings		$315.05

It is not the purpose of this article to determine the exact prices of the foregoing work but to indicate the method on which prices should be determined. It should not be difficult, by investigating the prices of items purchased, to arrive at unit costs on which can be based further estimates. Estimating on any class of work can only be accurately done by reducing the items to units on which costs can be determined. The smaller the units the more likely they are to give a correct total.

It is of course true that a frame 5 ft. x 7 ft. containing 24 lineal feet would not cost quite so much as two frames each 2 ft. x 4 ft. containing the same total of lineal feet, as there are in the latter eight joints to be framed, compared with four joints in the former, and other items could be criticised for similar reasons, but these things will adjust themselves in the general average. The writer's experience tends to show that in spite of some theoretical defects like those above suggested, this method of analyzing the cost of mill work gives results that can be relied upon.

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The contract for the State Forestry Building referred to a short time ago in these columns and which is being erected on the campus of the Syracuse University, has been awarded to Gustav De Kimpe, of Hoboken, N. J.

Society Advocating Fire Elimination

An organization which is planned to be made national in its scope has been effected in Cleveland, Ohio, to conduct an educational campaign in behalf of fire prevention by the more general use of fireproof building materials. Back of the movement are the manufacturers of fireproof building materials who hope in this way to increase the demand for their products. The organization is known as the Society Advocating Fire Elimination, the initials of the words spelling SAFE. This is said to be the first concerted effort of the manufacturers of fireproof building materials to popularize their products. While they will all be working together for their own good they claim that they will be doing the country a service by educating the general public to erect safer buildings.

Work to Be Extended to Other Cities

The society has organized a campaign in Cleveland and expects to extend its efforts to other cities as soon as manufacturers and dealers in those cities become interested in the movement. The campaign to educate the people will be conducted through the daily newspapers. Interesting articles such as the papers can be induced to publish will be prepared, so that there will be no expense for advertising space connected with this publicity. At a dinner given by the society at the Colonial Hotel in Cleveland, in June, speeches were made by some of the city officials and others, including H. B. McMaster, Youngstown, Ohio, director of the Association of Sheet & Tin Plate Manufacturers. Makers of sheets, sheet metal building material and steel material for reinforcing and fireproofing buildings are expected to take an active interest in the organization. Its officers are Henry H. Camp, president of the Camp Conduit Company, president; William A. Fay, vice-president, and W. T. Rossiter, treasurer. Ralph P. Stoddard is executive secretary. The society has opened an office at 340 *Leader-News* Building, Cleveland.

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Officers of Hardwood Lumber Association

At the seventeenth annual convention of the National Hardwood Lumber Association, held June 18 and 19 in Buffalo, N. Y., many instructive reports were presented, one of special interest being that of the Inspection Rules Committee. The importance of the manufacturing lumber industry may be gained from the fact that about 785,000 men are employed in it and the manufactured products are valued at $1,160,000,000. The point was made that the National Hardwood Lumber Association, with its 900 members, is "the greatest organization of its kind in the world, having for its main purpose the standardizing of inspection rules for hardwood lumber and the grading of lumber according to those rules."

The officers elected for the ensuing year were as follows: President, E. V. Babcock, of Pittsburgh; first vice-president, J. V. Stimson, of Huntingburg, Ind.; second vice-president, Hugh McLean, of Buffalo; third vice-president, F. L. Brown, of Chicago, and secretary, Frank F. Fish, of Chicago.

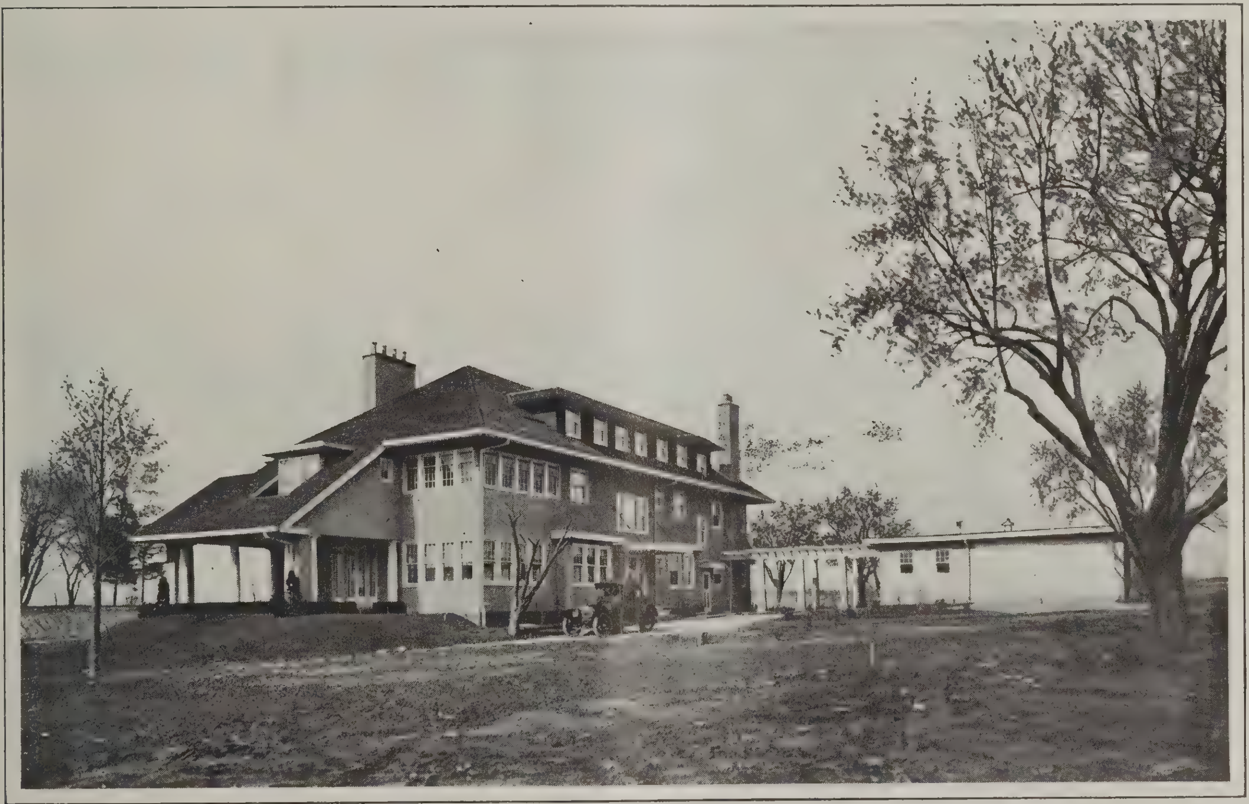
An Ohio Residence of Stucco Finish

An Excellent Example of Domestic Architecture Having a Coating of Stucco on American Ingot Expanded Lath

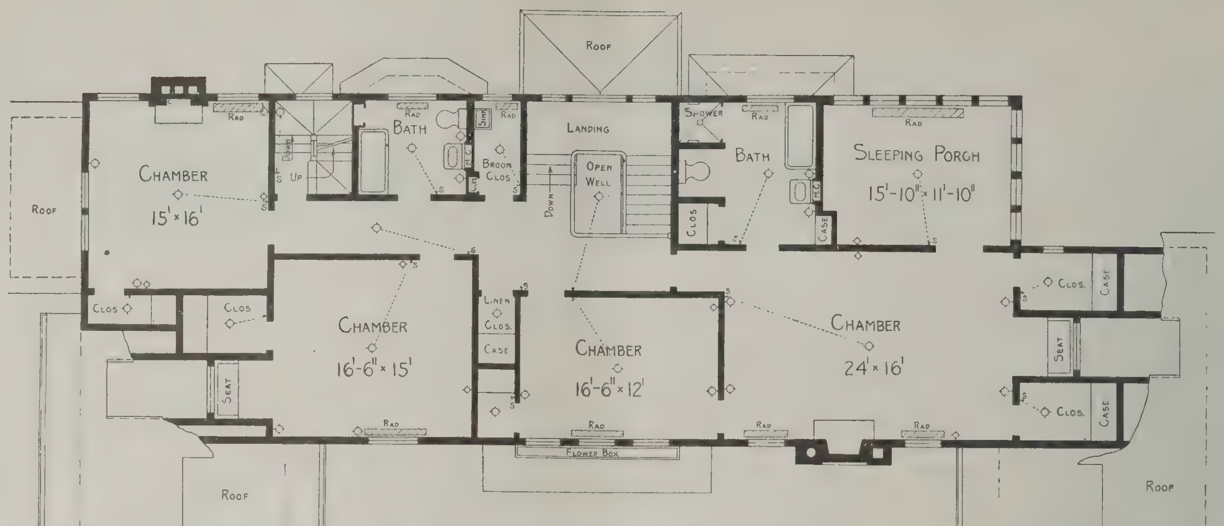
THE growing tendency among home builders throughout the country to finish the exterior of their dwellings with a coating of cement stucco and in some cases tinting the mixture to break the monotony of the gray surfaces, is strikingly manifest in the increasing numbers of such residences which are erected year by year. This form of construction, especially where the stucco is applied to metal lath has many features to commend it, not the least important of which ar eits fire-resisting qualities from without; its ultimate economy and the absence of requirements in the way of painting and repairs. It is applicable to the cottage of moderate cost as well as to the pretentious mansion, the results in all instances being governed by the character and excellence with which the work is done. A good example of residence construction in which the exterior treatment is after the manner described is illustrated upon this and the pages which follow. It is a roomy dwelling erected in the suburbs of Middletown, Ohio, for Charles R. Hook, general superintendent of the American Rolling Mill Company of that place. The photographic views here given indicate the appearance of the finished structure, as well as the interiors of various rooms, while the plans, elevations and miscellaneous details afford an idea of the arrangement and construction.

An examination of the plans shows a central entrance with reception hall, from which rise the main flight of stairs, extending through to the drive-entrance on the side where the garage with its pergola connection is located. At the right of the reception hall is the living room with which communicates a conservatory and the den. At the extreme right is the living porch. A view in the living room looking across the reception hall into the dining room is given on another page. At the left of the reception hall is the dining room and out of it opens the dining porch. Communication with the kitchen is established through a well-equipped pantry and across the passage beyond the dining room is the maids' dining room and the servants' stairs, as well as those leading to the basement.

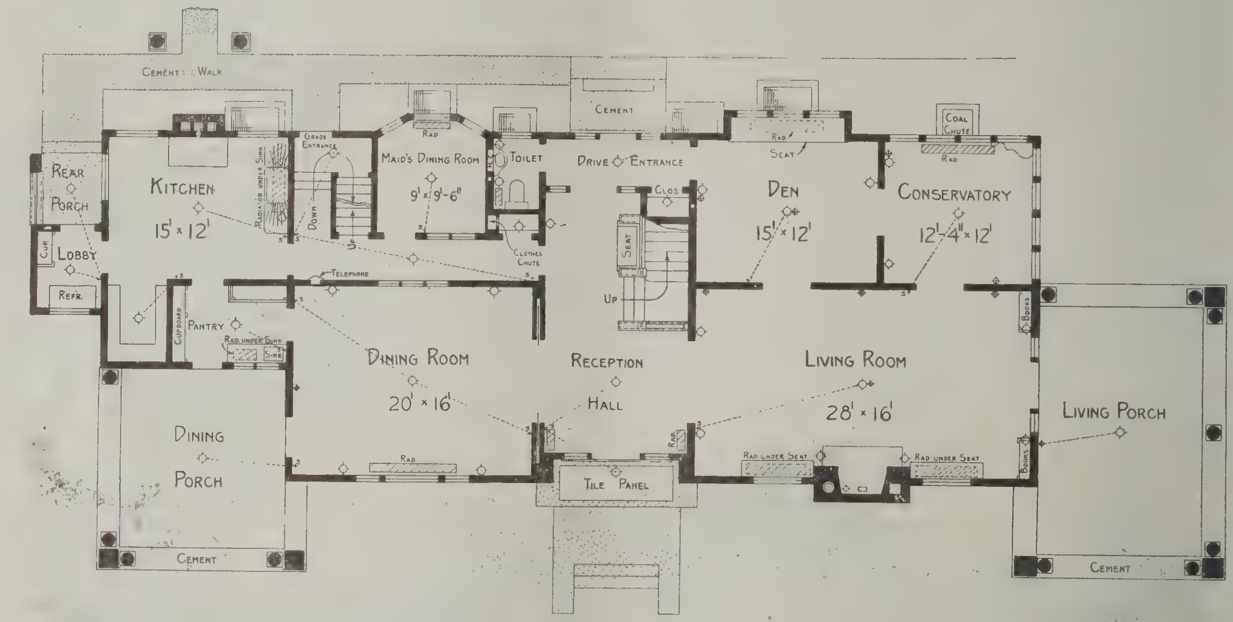
On the second floor are four sleeping rooms, two bathrooms and a sleeping porch. An interesting feature in connection with this sleeping porch is that the window sill is hinged, thus permitting it to be raised and the window itself lowered into a pocket, after which the sill is placed again in position. In



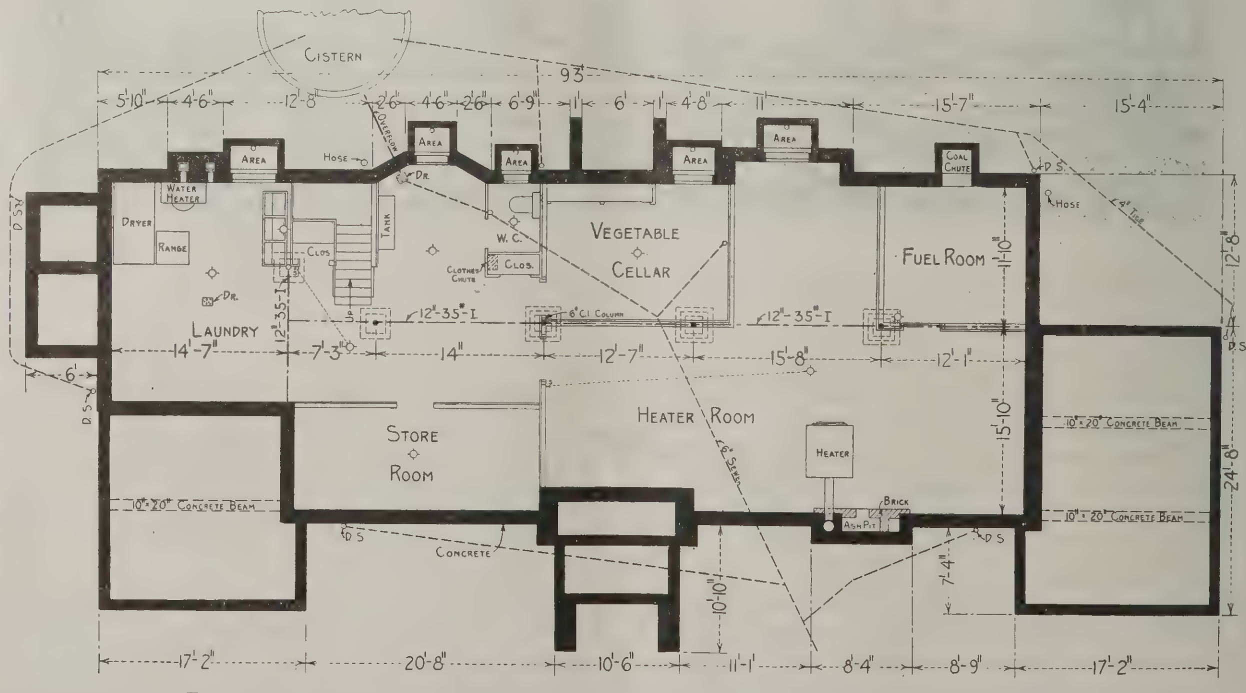
An Ohio Residence of Stucco Finish—The Garden or Drive Front, Showing Garage at the Right—Architect, G. C. Burroughs, Cincinnati, Ohio



Second Floor Plan—Scale 1/16 In. to the Foot

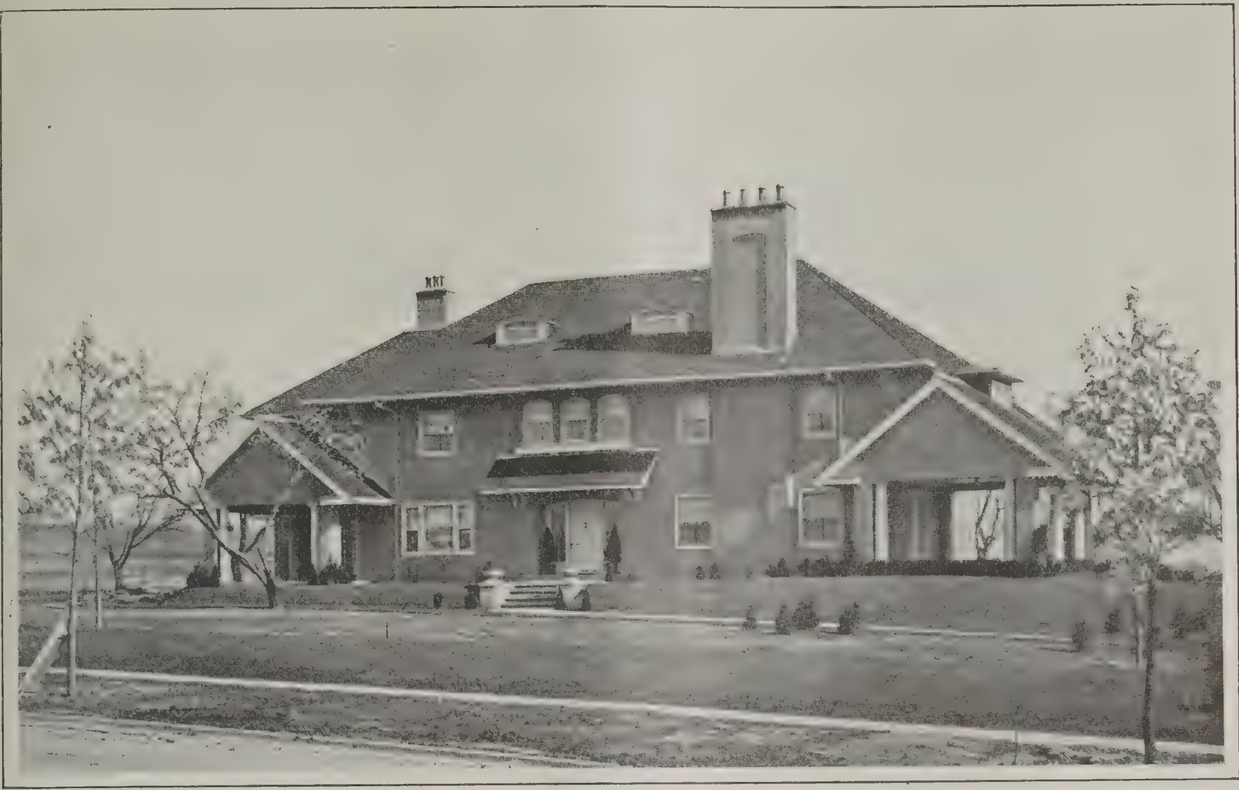


Main Floor Plan—Scale 1/16 In. to the Foot

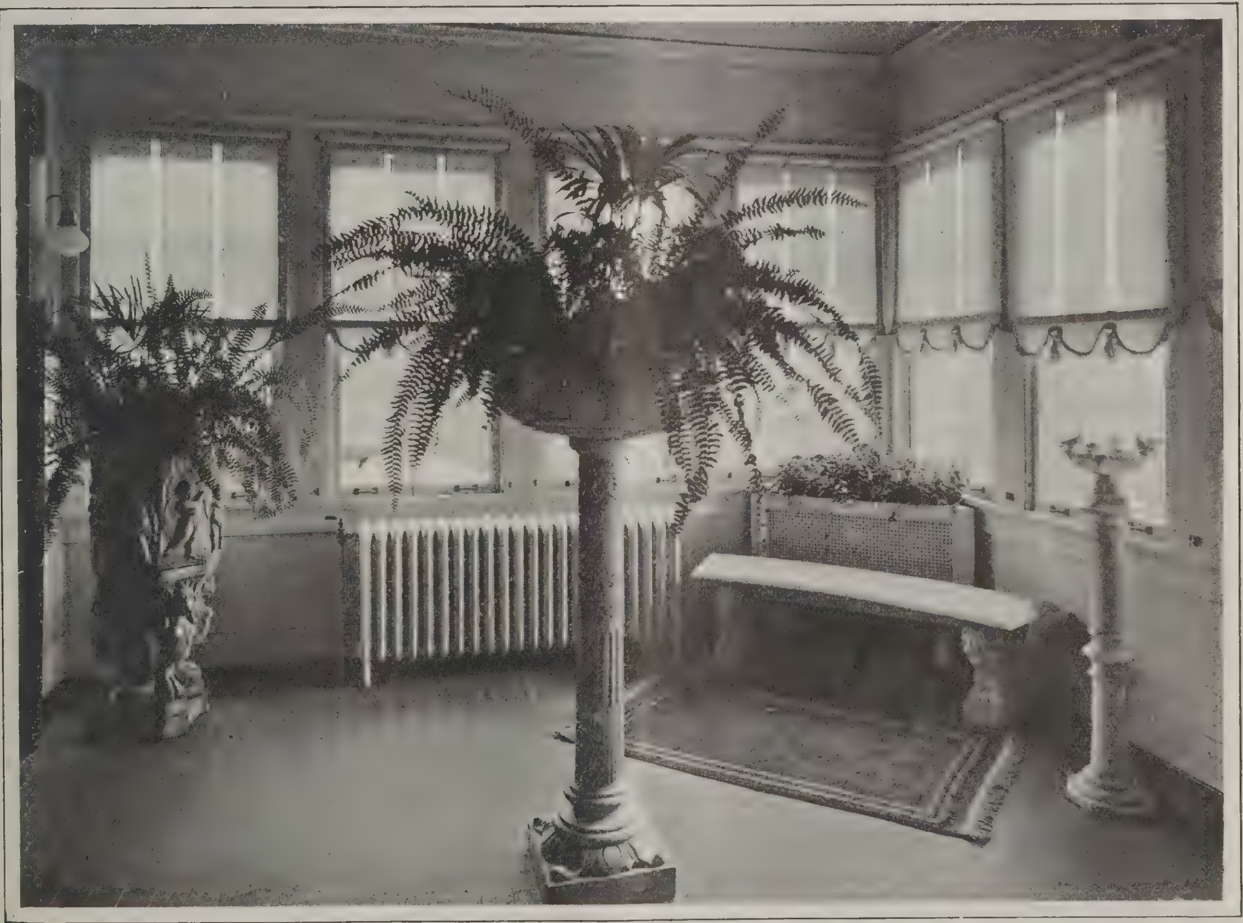


Foundation Plan, Showing Division of the Basement Space—Scale 1/16 In. to the Foot

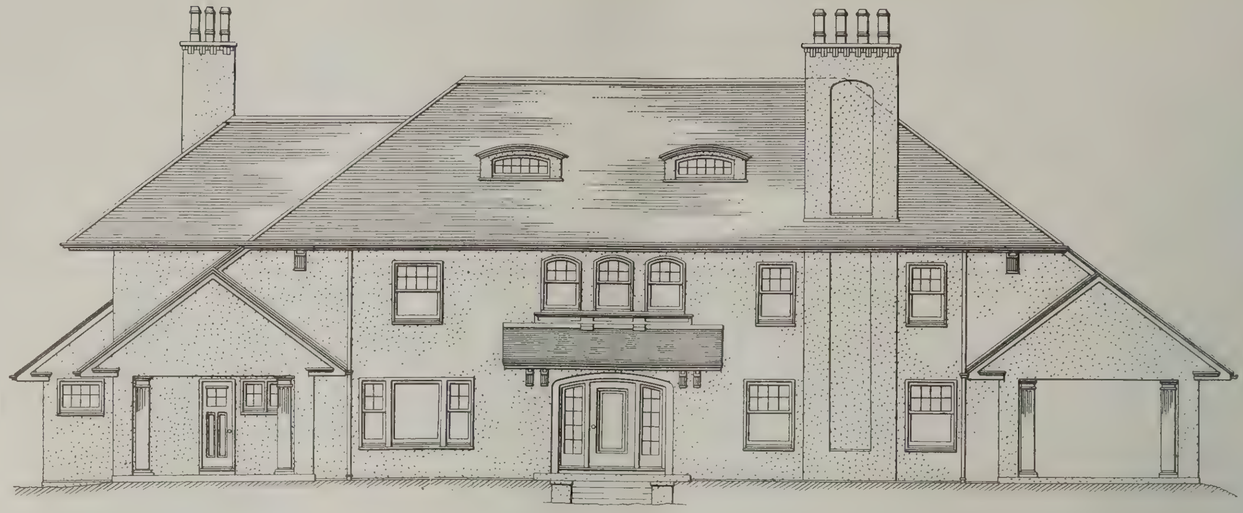
An Ohio Residence of Stucco Finish—G. C. Burroughs, Architect, Cincinnati, Ohio



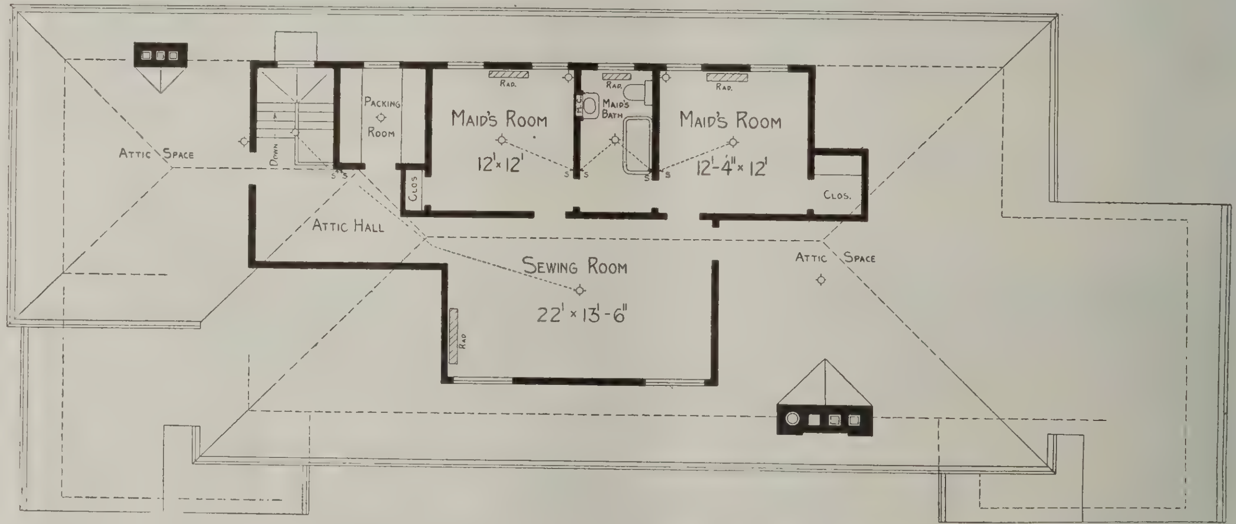
The Street Front of the Residence of Mr. Charles R. Hook, at Middletown, Ohio, Showing at the extreme right the Living Porch and at the extreme left the Dining Porch



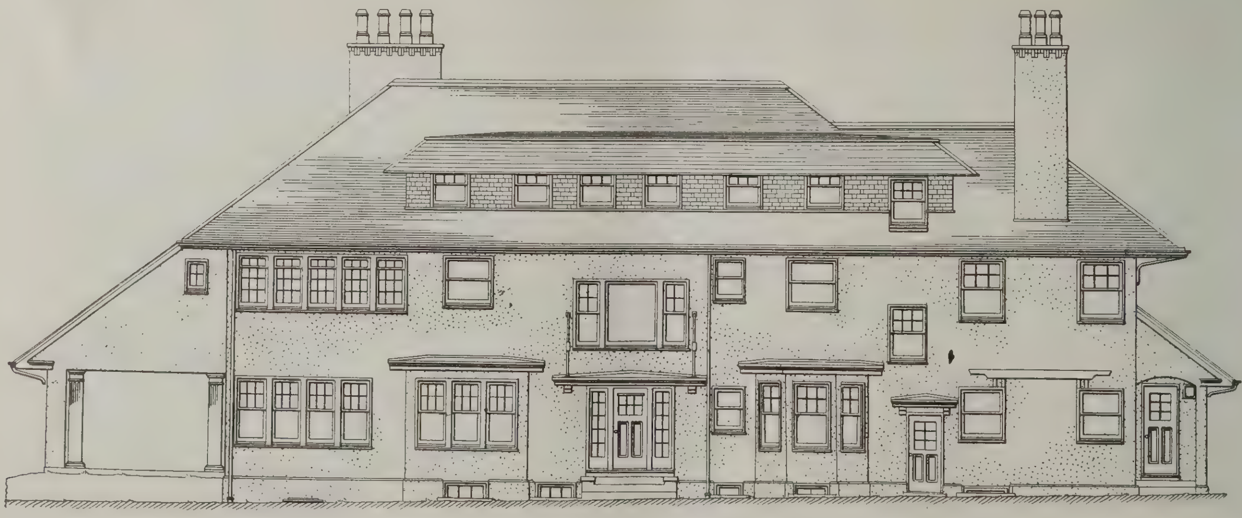
View in the Conservatory Looking from the Door Leading to the Living Room



Front or North Elevation Showing Dining Porch at the Left of Main Entrance and the Living Porch at the Extreme Right—Scale 1/16 In. to the Foot



Attic Plan with Outline of Roof—Scale 1/16 In. to the Foot



The Drive or South Elevation Facing the Garage—Scale 1/16 In. to the Foot

An Ohio Residence of Stucco Finish—Elevations and Attic Plan—G. C. Burroughs, Architect this way a full window opening is obtained, and during the summer the window is out of the way, yet in case of rain or inclement weather it can be immediately raised. By means of weather stripping this arrangement is made absolutely weather tight, and during the coldest weather and hardest winds the owner has been unable to detect any leakage of air. The sleeping porch, it will be observed, is located directly above the conservatory or solarium in the west end of the house, and opens off the main bedroom, or, as some would term it, the master's room.

The foundation walls are of concrete, and around the entire outside is a course of 4-in. porous drain tile. The cellar botttom is covered with 6 in. of clean cinders, on top of which is laid 3 in. of concrete mixed in the proportion of 5 sacks of cement to 1 yd. of clean river gravel, finishing with a top coat of one part Portland cement and two parts sand.

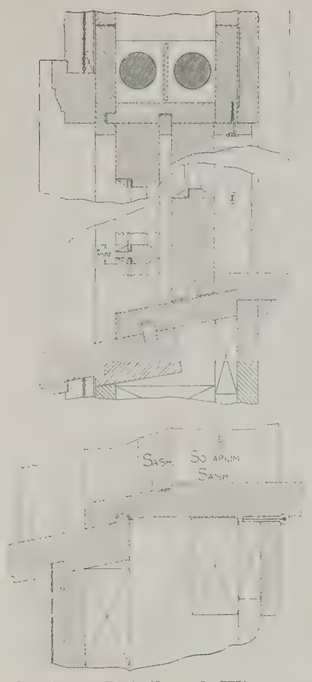
The framing is of yellow pine, the first and second story joists being 2 x 10 in.; attic joists, 2 x 8 in.; collar beams, 2 x 6 in.; main rafters, 2 x 4 in., and hip rafters, 2 x 8 in. The outside and inside studding are 2 x 4 in., tripled at the corners and doubled at the openings. All the above are spaced 16 in. on centers. All partition studding is bridged half way up by 2 x 4 in. pieces. The joists are doubled under partitions and all bridged every 8 ft., with 1 x 3 in. pieces. The porch floor joists are 2 x 8 in.; the main porch ceiling joists 2 x 4 in. and the rafters 2 x 4 in., placed 16 in. on centers. The ribbon boards are of 1 x 5 in. oak. The floor of the second story projection is insulated with mineral wool and building paper.

The entire outside of the house and all columns are sheathed with 7/8 x 5¼ in. dressed and matched yellow pine boards securely toe-nailed to each bearing, and then covered with Barrett's No. 1 tar felt paper, over which in turn is nailed 3/8 x 7/8 in. furring strips. These are put on vertically 12 in. on centers to receive American Rolling Mill's 24-gage galvanized iron spiral metal lath. No metal corners are used as the lath is bent around to make a key for the stucco corners. The exterior stucco was applied in three coats, the first coat consisting of Portland cement and sand, with a small amount of lime putty added; the second coat was a 1:2 mixture of Portland cement and sand, while the third coat consisted of white Atlas Portland cement and crushed limestone thrown on to give a uniformly rough surface without unsightly joinings.

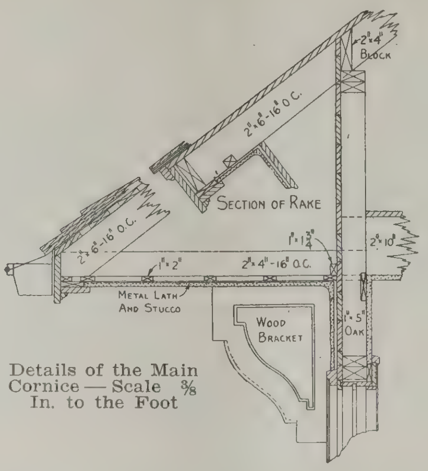
The main roofs are covered with 7/8 x 4-in. boards laid 1½ in. apart and covered with red cedar "Creodipt" shingles furnished by Standard Shingle Company, North Tonawanda, N. Y. The shingles are of random width and laid 4½ in. to the weather. The hips are of the same kind of shingles cut to 4 in. in width and nailed with 3d. galvanized iron hold-fast nails. On the main roofs 3d. genuine soft cut iron nails were used. Building paper was used between the sheathing boards and shingles.

The floors of the first and second stories, including conservatory are double, the under floor being 7/8 x 5¼-in. yellow pine, while the finish floor is of

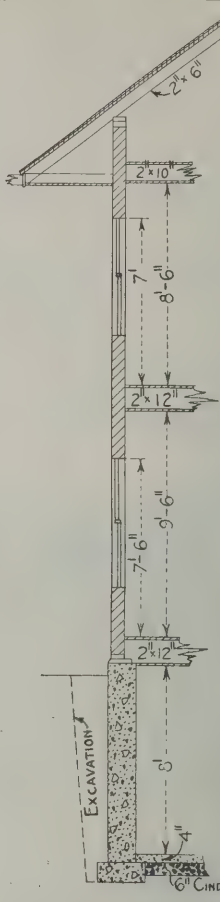
An Ohio Residence of Stucco Finish—The Living Room with Fire Place and Mantel at the Left and Looking Across the Reception Hall Into the Dining Room Beyond



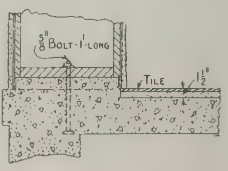
Various Details of Window Frames—Scale 1½ In. to the Foot



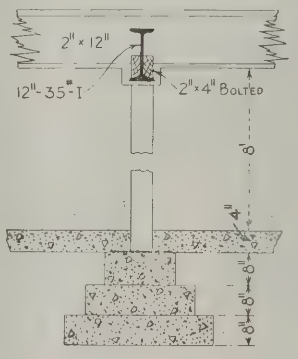
Details of the Main Cornice — Scale ⅜ In. to the Foot



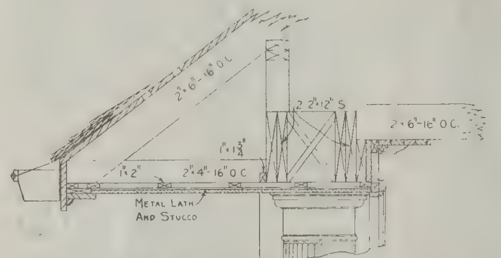
Section Through Main Wall—Scale ⅛ In. to the Foot



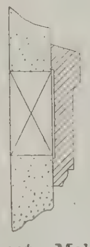
Section of Porch Column and Floor—Scale ⅜ In. to the Foot



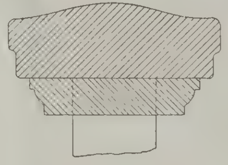
Section Through Pier in Cellar—Scale ¼ In. to the Foot



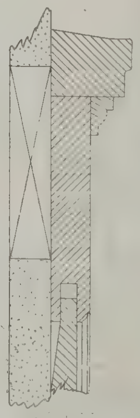
Details of Porch Cornice—Scale ⅜ In. to the Foot



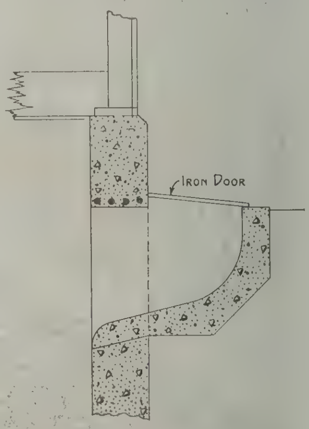
Wainscot Mold — Scale 3 In. to the Foot



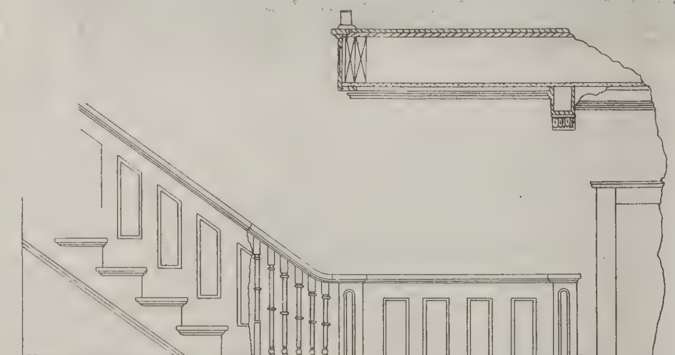
Section of Hand Rail of Main Stairs —Scale 3 In. to the Foot



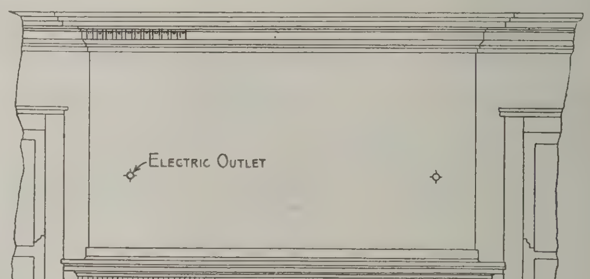
Detail of Panel Work on Hall Stairs—Scale 3 In. to the Foot



Section Through Coal Chute —Scale ¼ In. to the Foot



Side Elevation of Main Stairs with Door to Living Room at the Right—Scale ¼ in. to the Foot



Elevation of Living Room Fireplace and Mantel—Scale ¼ In. to the Foot

An Ohio Residence of Stucco Finish—Various Constructive Details

7/8 x 2-in. tongued and grooved oak, with No. 2 flooring felt between. In the kitchen, pantry and attic rooms the flooring is of 7/8 x 3¼-in. yellow pine.

The porch floors are of 1⅛ x 2½-in. Western fir. The porch ceilings are 3¼-in. V-beaded yellow pine, and the two fluted columns for the front porch are 12 in. at the base and 7 ft. high made of Western fir by the Hartmann-Sanders Company, Chicago, Ill.

The front door is 2½ in. thick, and all other outside doors are 1¾ in. thick, of white pine. The inside doors are of the two panel variety and of white pine 1⅜ in. thick.

The doors in the den are veneered red gum on the room side. The basement and attic doors are 1⅜ in. thick, with white pine stiles and yellow pine panels.

The finish throughout except as otherwise specified is of short leaf yellow pine. The trim in the den is kiln-dried red gum, selected for dark grain throughout.

The main stairs have risers and strings of poplar with birch treads 1⅛ in. thick. The hand railing is of birch, mahogany stained, and the turned spindles are of poplar.

All ceilings, partitions, soffits of stairs, etc., are plastered with two-coat work applied to American ingot iron clincher lath, use being made of United States Gypsum Company's patent plaster. The kitchen, pantry and bathrooms have a wainscoting 6 ft. high of United States Gypsum Company's plaster applied according to directions and finishing with the company's "Universal" finish and marked off to represent 4 x 4-in. tile. All walls and ceilings above wainscoting in kitchen, toilet and bathrooms; also in maids' dining room, rear hall stairs to attic, conservatory and attic hall and rooms have a fine sand float finish.

The toilet and second floor bathrooms have 1¼-in. hexagon tile floors with sanitary base. In the larger bathroom the wall tile is carried 7 ft. high inside the stall for the shower bath and finished with plain cap up to marble stiles.

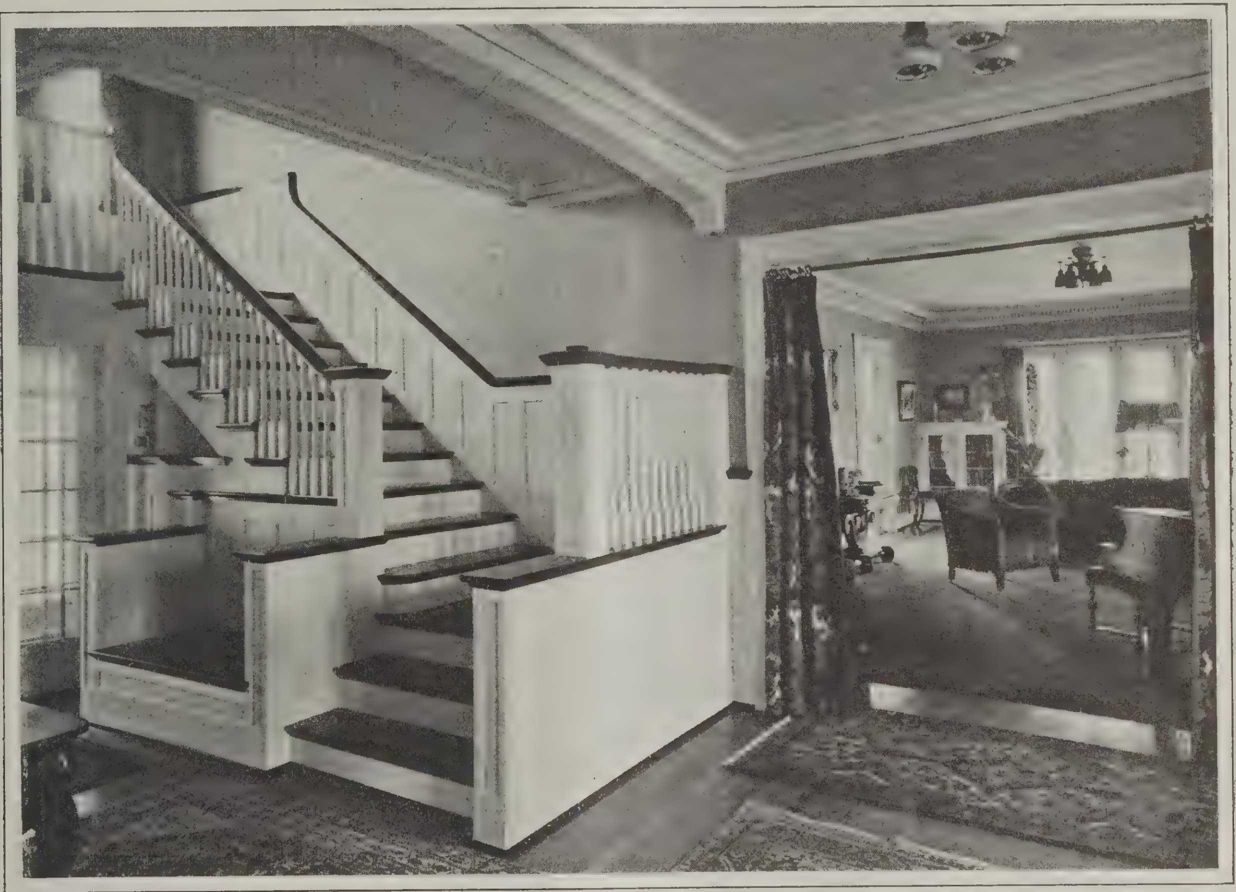
For the shower there is a 1⅛ x 4-in. polished white Italian marble frame with 4-in. apron at top and floor. The opening is 7 ft. high in the clear.

The gutters of the main roof and porches are of the hanging type made of No. 24 galvanized iron. The down spouts are of heavy gage polygon galvanized iron and the roofs of rear hoods, canopy and dormers are covered with American ingot iron.

The house is piped for gas and wired for electric lighting. Service wires are placed of sufficient size over that required for lighting the house to furnish current for operating the motor for vacuum cleaning apparatus and a V. & K. automatic electric motor pump. All switches throughout, except in basement and attic rooms are of the diamond H push type, with plates finished to match the hardware.

The exterior trim has three coats of white lead and zinc combination paint in colors. The sash has three coats of white on the outside and the outside of the front door with sash, and also French doors to the dining and living rooms have four coats, finished with two coats of Pratt & Lambert's "Vitralite" enamel. The other outside doors are painted three coats to match the trim.

The inside finish of the house is in white enamel furnished by the Chicago Varnish Company, Chicago, Ill. The birch woodwork on the first and second floors is mahogany stained. The trim in the

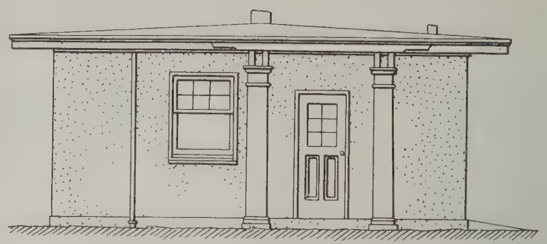


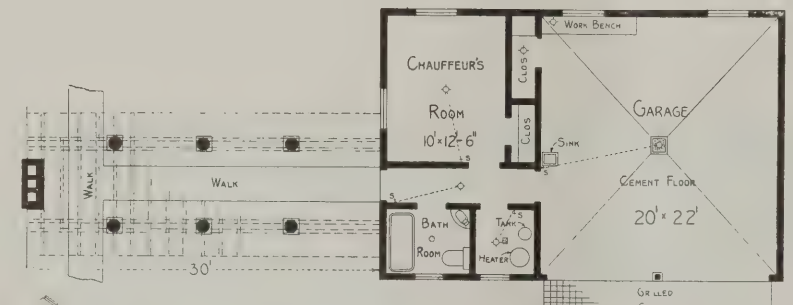
An Ohio Residence of Stucco Finish—The Main Stairs, with Living Room to the Right toilet and bathrooms is finished with two coats of Pratt & Lambert's "Vitralite' left in the gloss. The plastered walls and ceilings in the kitchen, pantry, rear hall and kitchen closet are painted three coats in selected colors and varnished. The walls above the tile work as well as the ceilings in the toilet and main bathrooms are painted three coats ivory white and finished with "Vitralite" enamel.

The heating is by means of a hot water system embracing an Ideal sectional boiler made by the American Radiator Company.

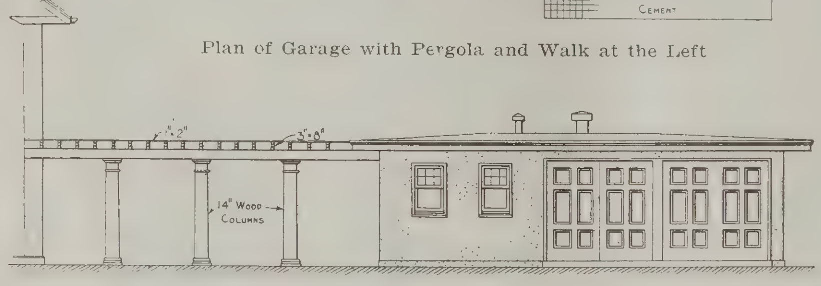
The garage, of which plan and elevation are given among the details on this page, provides accommodations for the chauffeur, also a bathroom and heater room, together with various closets. The garage space measures 20 x 22 ft. in area, and the main floor drains to the center.

In connection with the cement work, it is interesting to note that all the cinders used were furnished free at the plant of the American Rolling Mill Company.

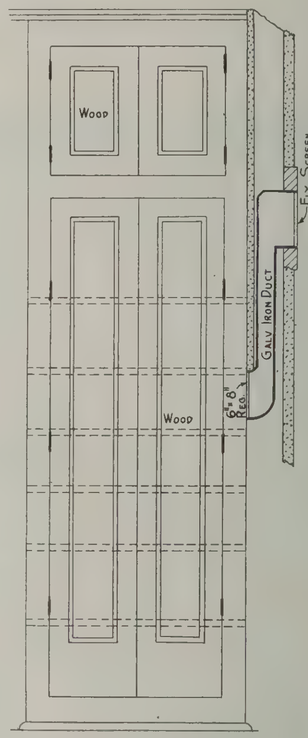

North Elevation of Garage—Scale 3/32 In. to the Foot



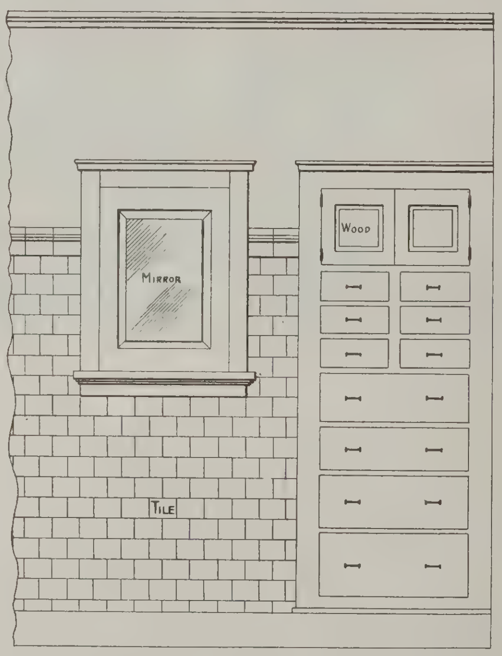
Plan of Garage with Pergola and Walk at the Left



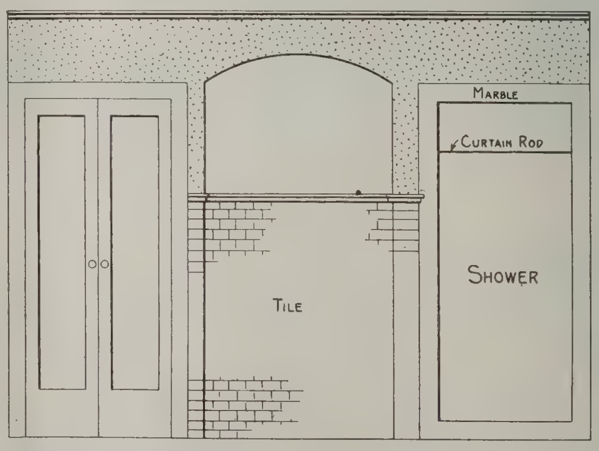
Side Elevation of Garage and Pergola—Scale 1/16 In. to the Foot



Elevation and Details of Cold Cupboard in Lobby—Scale ⅜ In. to the Foot



Elevation of Linen Case and Medicine Closet in the large Bathroom Containing the Shower. Scale ⅜ In. to Foot



Elevation in Bathroom Looking Toward Closets and Shower—Scale ¼ In. to the Foot

An Ohio Residence of Stucco Finish—Miscellaneous Constructive Details

The residence of Mr. Hook was erected by Coldwell & Isening, contractors, Middletown, Ohio, and the plans were prepared by G. C. Burroughs, architect, Union Trust Building, Cincinnati, Ohio.

Design of Beams, Girders and Trusses

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C. E.

THE loads acting downward exert an action on the beam, which is resisted by the strength of the bearing. Considered theoretically the bearing exerts an upward force pushing against the downward force and equal in amount. This is an example of the old saying, "Action and reaction are always equal and in opposite directions."

The reactions being equal to the load, it follows that the reaction of a cantilever beam is equal to the sum of the weight of the beam and all loads it may carry.

$R =$ reaction.

For beams carried on two or more supports a method will be given later for computing the reactions on each support.

Shear

Shear is a downward cutting force exerted at the edge of each support. It is called shear because if the material is soft the edge of the support will cut it. A piece of butter resting on the edges of two upturned knife blades is as good an example as any, perhaps, of true shear.

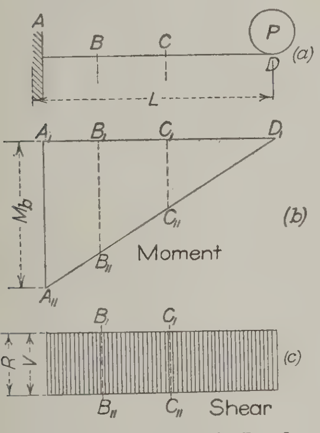


Fig. 3—Concentrated Load at End of Beam

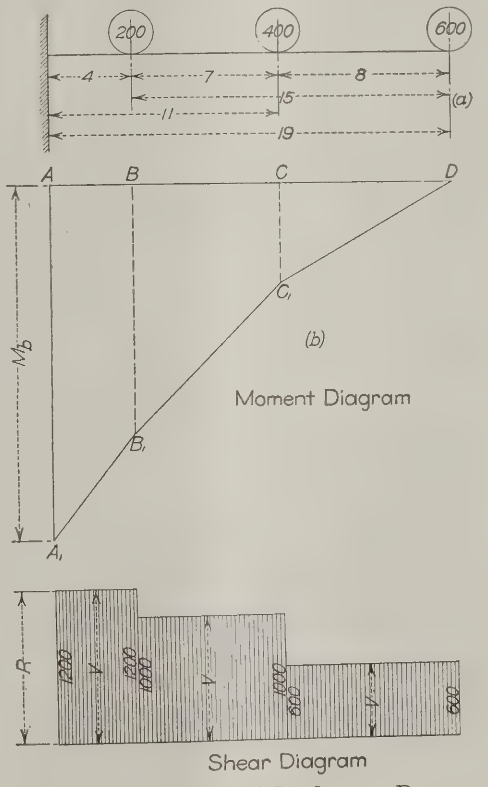


Fig. 4—Several Loads on a Beam

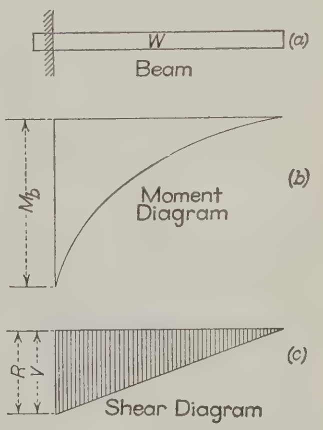


Fig. 5—Diagrams for a Uniformly Distributed Load

Design of Beams, Girders and Trusses

$V =$ shear. It is always equal to the reaction at the support, and at other points on the beam varies according to laws to be hereafter explained.

The use of the capital V to designate shear may be explained by its resemblance to a sharp cutting edge. Mathematicians may give another reason, but the writer is interested in fixing a fact in the mind of the student.

Graphical Methods for Moment, Shear, Etc.

In Fig. 3 a concentrated load acts at the point D on the beam, A D. The beam is drawn to any scale and the load shown on it, as in Fig. 3. Underneath is drawn the line A, D and the bending moment at the support is computed. Plot this to any scale (say 1000 lbs. = 1 in.) on the vertical line A $A_{,,}$. Connect $A_{,,}$ to D, by a straight line $A_{,,}$ D, as shown at (*b*). To find the bending moment at any intermediate point on the beam drop a vertical line across the diagram at (*b*) and the length of the line intercepted between the upper and lower lines of the bending moment triangle gives the bending moment. For example the bending moment at B is given by the line B, $B_{,,}$ and the bending moment at C is given by the line C, $C_{,,}$. The vertical lines are forces and the horizontal lines are lengths, the closing line of the triangle being merely a closing line. There is no bending moment at D.

At (*c*) is drawn the shearing diagram. The load being concentrated at the end, of course the shear is constant from the point of application of the load to the support. The shear may be found at any point by measuring a vertical line at the point across the shear diagram.

Relation Between Shear and Moment Diagram

Assume line C, C'' to be dropped across the shear diagram. Then the area of the shear diagram to

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Note—In this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

the right of the line gives the bending moment at C. Similarly the area of the shear diagram to the right of line $B, B_{,,}$ gives the bending moment at B. The area is in foot pounds because the vertical dimension is expressed in pounds and the horizontal dimension in feet. The relation is true of all cases, so it will not be necessary to mention it again.

In Fig. 4 is shown the case of several loads on a beam. The bending moment at $D = 0$. The bending moment at $C = 8 \times 600$, and this is plotted as line $CC_,$. The bending moment at $B = (15 \times 600) + (7 \times 400)$, and this is plotted as line $B B_,$. The bending moment at $A = (19 \times 600) + (11 \times 400) + (4 \times 200)$, and this is plotted as line A $A_,$.

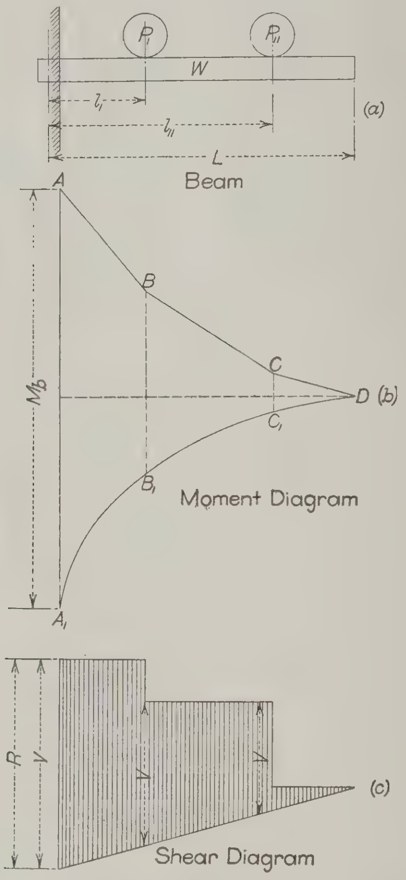

Fig. 6—A Cantilever Beam Carrying Two Concentrated Loads

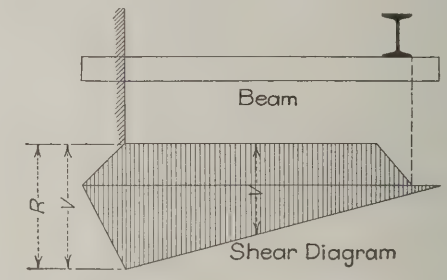

Fig. 7—A Cantilever Beam Supporting an I-beam

Design of Beams, Girders and Trusses

The shearing diagram shown at *(c)* shows the shear at the right end to be constant and equal to the load at the end until it reaches the next load. It immediately changes to the sum of the two loads and continues as a constant amount to the next load when it immediately becomes the sum of the three loads, continuing thus to the point of support.

In Fig. 5 is shown the diagrams for a uniformly distributed load.

The shear at the end $= O$ and the moment at the end $= O$. The shear diagram at *(c)* is seen to be a triangle and the shear at intermediate sections varies as the vertical depth of the triangle at the respective sections.

The bending moment diagram is formed by a closing line which is a semi-parabola. This may be proven by dividing the uniform load into any number of loads equal in amount and finding the moment, as in Fig. 4, for each load and connecting the ends of the moments drawn to scale. The closing line is a broken line, which approaches a curve, depending upon the number of unit loads into which the uniform load is divided. By using a sufficient number the closing line becomes a parabolic curve.

If we assume the unit load to be one foot long and call it w, the moment at any point is

$$M_b = \frac{wl^2}{2}$$

By using this formula points may be plotted one foot apart and the ends connected by using a French curve.

When a beam carries concentrated loads the shear and moment diagrams are drawn as described for the uniform load. Then the moments and shears due to the concentrated loads are drawn *upward* from the top horizontal line of the diagrams. The total moment at any point is the distance from the top closing line to the bottom closing line, the intermediate horizontal line being disregarded. This is shown in Fig. 5.

In Fig. 6 is shown the actual shear when the loads have a definite width and when the beam rests on a support of a definite width. At the face of the support the shear is a maximum and it is zero at the end of the support.

(*To be continued*)

Fires Due to Defective Flues

It is a sad commentary on American methods of building, American laws concerning building and the American habit of carelessness that defective flues should be responsible for twice as many fires as any other known cause. It is estimated that 13 per cent of the total number of fires annually can be attributed to defective flues, with an average property loss of about $12,000,000. The destruction of a cotton compress in Mississippi, with a loss of over $300,000, was due to a little brick unedged flue through the cracks of which sparks spread to the property. The money lost in this fire would have paid for the removal and rebuilding of every bad flue in the State of Mississippi. Carelessness in the construction of flues has become so general in the South that the insurance companies have been forced to penalize dwellings with improperly constructed flues. In most of the states the charge is 35 cents for each defective flue in the dwelling. It is hoped that this increase will call the attention of property owners to the hazard and lead to its correction, and in the meantime the companies are reimbursed for the risks they run by an increased rate.

Waterproofing Cement Surfaces

The Proper Way to Treat Cement Surfaces So as to Render Them Waterproof and to Permit of Their Decoration

WE present in what follows copious extracts from a paper on the subject indicated by the above title read by George H. Gresser at a recent meeting of The Builders' Exchange of Canton, Ohio:

"This problem is of great interest to the architect, engineer, building contractor and owner, as it is only recently that cement and concrete are being used extensively in the construction of the modern building.

Production of Cement

"Statistics show us that in the last fourteen years the production of cement has increased from 3,000,000 barrels to 35,000,000 barrels a year. The cause of this wonderful increase is due to the economy in manufacture and efficiency in concrete construction. But with all the advantages that cement has over other materials as to economy and strength, great care must be exercised in mixing and applying it to the finished surface, to get it uniform in color. It has been proven that hollow blocks absorb moisture 4 to 5 per cent. of their own weight and retain this moisture for some time. Damp walls, as we all know well, are a detriment to health, and this factor is appreciated to such an extent that it has actually retarded the use of concrete in some instances.

"Another argument against cement surfaces is that we do not get a uniform, pleasing color, but get varied shades of dull gray, very uninviting, that do not compare with the rich colors we find in terra cotta, granite, brick and decorated wood surfaces. There is no comparison, as cement surfaces, undecorated, give us a dreary, sometimes dirty, color that does not reflect the light, but absorbs it, and does not please the eye or appeal to the artistic temperament.

Desirable Qualities in Concrete

"This little talk is not intended to condemn cement as a building material, but to advocate its use more than ever by improving upon what is done in that line to-day. If we can add to its strength, economy and fireproofing features a decorative rich color, and at the same operation make it moisture and strictly waterproof, we certainly will have a building material that cannot be duplicated the world over.

"But, you will say, we have it now to a certain degree. Some makers of cement add color while making the cement. Some engineers and architects specify waterproof powder or liquid to be added to the cement while mixing. This has not been proven a success, as anything of that nature added to cement decreases its tensile strength to such an extent that it is almost unsafe. It also affects the metal used for reinforcements. You cannot get the added color on waterproofing compounds mixed uniformly, and still have your different shades, and this very often deteriorates the concrete body and leaves a bad surface for any kind of painting in the future."

Proper Way to Treat Cement Surfaces

The question now arises: "What is the proper way to treat cement surfaces so as to get them decorated and waterproof?" This paper, as you can see, can be made a very lengthy one and requires careful study and research and would take up too much of your time. I am, therefore, going to touch upon the most important points only, and to give you the benefit of my experience along that line.

Washes, brushed on the finished surface of cement, made from waxes, gums, paraffin, etc., have been tried, but without complete success. It was now up to the paint manufacturer and painter to come to the rescue and make cement more popular and practical than ever as a material for building.

The paint maker and painter received very little encouragement from the engineer and cement maker when they first started on this problem, but finally, after years of experimenting upon all the different forms of concrete construction and under all conditions, and after a strenuous campaign of education and putting on sample jobs at enormous expense the "big ones" in the cement business and "big builders" began to sit up and take notice. They now look upon the paint makers and master painters as their best friends, as they have helped them out of many difficulties.

One Method That Was Unsatisfactory

The first method used with paint was to first give the cement a washing with zinc sulphate and finish over this wash with a white lead and linseed oil paint, but the paint does not hold up, and it is now conceded that linseed oil paint is a failure for cement surfaces, as the alkaline salts in the cement attack and disintegrate it.

The last and most successful method and material used to-day, and conceded by chemists, engineers and concrete men to properly decorate and waterproof cement is a specially prepared paint, in several shades, to be brushed on by competent painters. The material contains no linseed oil or white lead and firmly adheres to the surface, filling small cracks and voids. Such a material is made by different manufacturers under various proprietary names, and requires two or three coats, which can be put on damp surfaces, but should be put on dry surfaces, and does not cover more than 200 square feet to the gallon, one coat. This material gives the dead flat finish of cement, and adds to the cost of your contract between 35 and 40 cents per square yard of surface painted. The smooth or rough surface of the cement finish has all to do with the cost of labor and material, as the stucco and rough cast surface requires more material and more brushing than the smooth troweled surfaces.

Up to this point I have touched upon cement surfaces of the outside of buildings only. But we have inside walls and floors which must be decorated and made damp-proof, and floors must be made so the cement does not dust off.

Inside cement walls are either in the damp or dry class. Damp walls, especially where there is a water pressure, such as along rivers and walls that get soaked with water after heavy rains, are a problem and should, if possible, be coated on the inside and outside with a paint made from asphaltum products and decorated afterward with regular cement coating. Inside cement walls that appear dry are not such a difficult problem and can be treated the same as ordinary walls.

In connection with the damp class of walls I will say that there are on the market to-day several points recommended and made to apply on damp walls, but cannot say as to their success when used against water pressure.

Cement Floors

Another class of surfaces are cement floors. We all know that when put to heavy wear they soon show defects, get slippery or throw off dust, especially where rich in cement and troweled to a granolithic surface. Giving the floor a cement wash will not answer for factories, shipping rooms or engine rooms. The acids in the lubricating oils attack the cement and destroy its bond. The texture of cement floors and the finish vary so much that we cannot make the same specifications for all of them. They must be tested with specially prepared paint and put on by some one who has made a special study of damp-proofing and decorating cement surfaces.

As a business proposition for the general contractor, I think it will be well to investigate this matter, as it is practically a new branch in the building business, and I am sure you can secure more cement contracts when you can say to your customers that you can overcome the unsightly color and non-uniform appearance of America's greatest building material.

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Pittsburgh's New Public Bath House

The contract has just been awarded for the erection of a free public bath house in the heart of the mill district of the south side in the city of Pittsburgh, Pa., which will have a frontage of 58 ft. and a depth of 94 ft. It will be of the English Tudor style of architecture, of red brick construction with trimmings of white limestone and will be thoroughly fireproof.

The swimming pool will be 40 x 61 ft. in size and have a graduated depth running from 3 ft. at the entrance end to 8 ft. at the farther end. It will be equipped with a safety net for children and will have sanitary scum-gutters. Sea green glazed tile will be used for the lining of the pool which will give the water a clear greenish effect.

On the first floor will be the entrance lobby, stairway and superintendent's office and in addition there will be shower rooms that will accommodate 100 persons at a time. On the second floor will be tub baths; also toilet rooms for men and women. A gallery will completely surround the pool and here will be located the dressing rooms.

The walls, floor and furnishings will be buff cream enameled brick. The building will be equipped with laundry and heating plant and the most modern ventilating system. It is to be free to the public and will be endowed by Mrs. Edith A. Oliver, widow of the late Henry W. Oliver, a pioneer steel manufacturer of Pittsburgh. The plans were drawn by McClure & Spahr, Pittsburgh, Pa.

◆

Slate Production in the United States

While the production of slate is one of the lesser important industries of the United States the output in 1913 was valued at $6,175,476, which, according to the report just issued by the United States Geological Survey, was an increase of $132,158 compared with 1912. This increase did not represent any unusual activity in the slate trade, but was caused by an advance in the average price of the material itself. In fact, as compared with 1904, when the slate output was valued at $5,617,195, the output in 1913 shows an increase in value of only 10 per cent.

All the eight producing States except Maryland, Vermont and Virginia increased in total value of output of slate over 1912, the largest increase, 14.62 per cent., being in Maine.

The value of mill stock, including slate sold for all purposes other than roofing, increased from $1,407,133 in 1912 to $1,714,414 in 1913, a gain of $307,281. Exclusive of blackboard and school slates, the mill stock increased from 5,765,273 square feet, valued at $1,013,220, in 1912, to 6,312,011 square feet, valued at $1,233,838, in 1913, an increase of 546,738 square feet in quantity and of $220,618 in value.

Mill stock includes slate used for blackboards, school slates, flooring, wainscoting, vats, tiles, sinks, laundry tubs, grave vaults, sanitary ware, refrigerator shelves, flour bins and dough troughs for bakeries, electric switchboards, mantels, hearths, well caps, and billiard, laboratory, kitchen and other table tops.

In 1913 the output of roofing slate was reported as 1,113,944 squares, valued at $4,461,062, a decrease as compared with 1912 of 83,344 squares in quantity and of $175,123 in value. The number of school slates sold in 1913 was 6,174,526, valued at $51,313, and the blackboard material amounted to 3,504,162 square feet, valued at $426,703.

◆

Cement Production in 1913

All records for production of Portland cement in the United States were broken in 1913 when the total output was 92,949,102 barrels valued at $93,001,169, these figures according to the report of the United States Geological Survey issued June 29 comparing with 83,351,191 barrels in 1912 valued at $67,461,513.

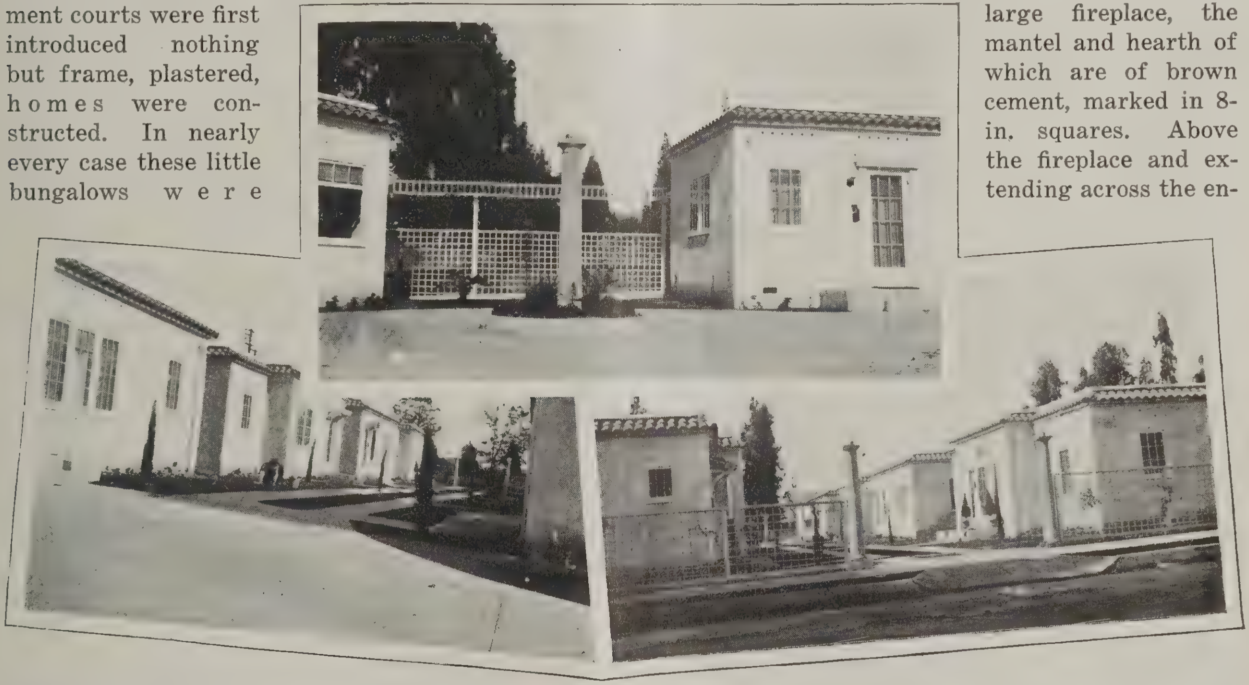
Pennsylvania takes the lead with a production of 28,701,845 barrels; Indiana ranks second with 10,872,574 barrels and California third with 6,159,182 barrels.

A Concrete Single-Apartment Court

A Unique Arrangement of Individual Bungalow Apartments of Three and Four Rooms Each

By Albert Marple

A NEW type of home building, or, we might better say, apartment building, has sprung up recently in Southern California—this being the individual bungalow apartment. This is obtained by erecting a number of bungalows of the three-room and four-room variety upon a building lot, say, 60 x 200 ft., although a little larger may be preferred. These bungalows are always one-story affairs and are fitted with all the modern conveniences. While everything possible is done to eliminate the appearance of "crowding," it is primarily the object of the builder of one of these courts to erect as many of these individual apartments on his limited piece of real estate as possible, so that the largest possible revenue may be received.



Upper Picture Shows Part of Private Plaza at Rear of Court—Left Hand Picture Is View from Back of Court Looking Toward the Entrance—Right Hand Picture Shows Entrance to the Court

A Concrete Single-Apartment Court

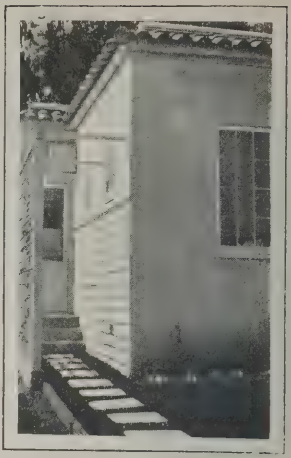
When these apartment courts were first introduced nothing but frame, plastered, homes were constructed. In nearly every case these little bungalows were rented for the average price of a small modern apartment—$15 to $20 per month, unfurnished, and it is needless to say that they were greatly in demand.

But the very latest thing in the way of an individual apartment court is made of concrete. That is, the dwellings, walks, and in fact, everything that can possibly be made of concrete and cement is built of these materials. A glance at the accompanying illustrations will give some idea of what is meant by the "Concrete Individual Apartment Court." They will show the very newest features and will exhibit the very latest designs and ideas in this particular line of home construction work.

Each of these homes contains what is known as four rooms, but which in reality is six rooms. Each takes up a ground space of 20 by 30 ft., a remarkably small space on which to squeeze this very complete dwelling. The bungalows in this court are fitted with all modern conveniences, such as hot and cold water, gas, electricity, disappearing beds, built-in book cases, etc. Each home has indirect lighting in the living and dining rooms, and a number of other up-to-date features, which the following description of one of the dwellings will reveal:

We will take for example a north-front bungalow. Through the front entrance we enter the living room, which is 12 x 14 ft. in size. Opposite the front door we find a large fireplace, the mantel and hearth of which are of brown cement, marked in 8-in. squares. Above the fireplace and extending across the entire width of the room, is an 8-in. mantel shelf. Below this shelf on either side of the fireplace are cases with shelves which may be used for either books or fancy china. The baseboard in this room is 1 ft. wide, the walls are papered, the ceiling tinted and the floor is of hardwood. Passing eastward we enter the dining room, 10 x 12 ft., with casement windows along the north side. These rooms are separated by buttresses 3 ft. in hight and extending a foot from the wall, in the dining room side of which are fancy china closets. Opposite the windows is the buffet, with china cupboards above and linen drawers and silver compartments below. This

Flower Mound and Electric Light Post in Center of Plaza



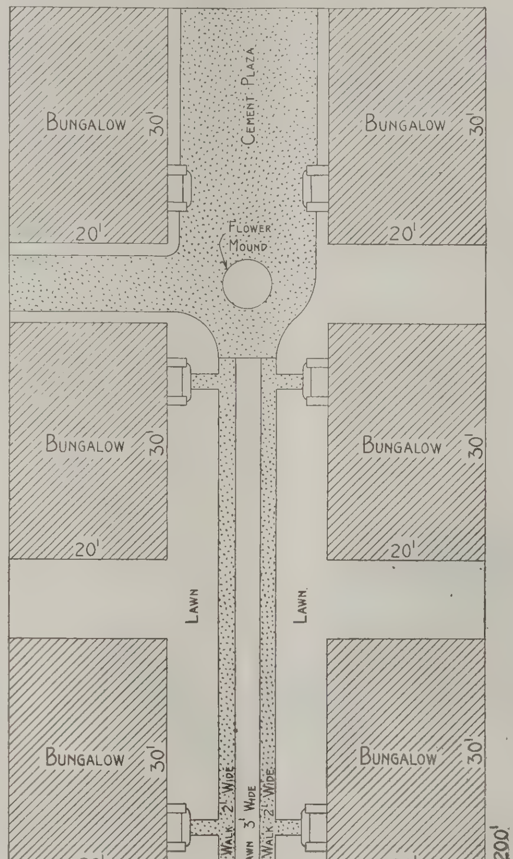
A Rear Entrance Showing Cement Stepping Blocks

room has a 3-ft. stained wainscoting, tinted ceiling and hardwood floor.

Continuing farther east, we enter the bedroom, which is 8 x 10 ft. in size. This is light and cheery, there being casement windows on both the north and the east sides. The bed is, indeed, a unique feature. It slides through the wall which separates the bedroom and the outdoor sleeping porch. The object of this is to permit either indoor or outdoor sleeping, the change from one to the other necessitating only the sliding of the bed, which runs on rollers, to one extreme or the other. Above this bed on the bedroom side are closets for linen, etc. This room also has hardwood floor, and at the south side, next to the rolling bed, is a large clothes closet. The sleeping porch is 7 x 9 ft. in size and has a 3-ft. wainscoting, the remainder of the walls and ceiling being tinted.

The bathroom opens from a "dark" corner of the bedroom and is, indeed, a pleasant little room, 6 x 9 ft. in size. It contains bath, toilet, lavatory, medicine chest, towel racks, etc. This room is located on an 8-in. rise, this being due to the fact that the drawers of the cabinet kitchen when closed are directly beneath the bath tub. The room is finished in white enamel having a semi-gloss.

The kitchenette opens off the southwest corner of the dining room and is a model of completeness. As we enter this little compartment we find at our right food closets, gas range, sink and drainboard, at the rear of which is the back door. At our left are food closets, refrigerator in a separate compartment, then cupboards, drawers, etc. The drawers are at the bottom and extend up a hight of about 3 ft., at which point is a long work table. Above this table are many spacious closets for dishes, etc. The room is finished in the natural color of the wood and is varnished. For lighting there is a single window at the end of the room and a double window over the sink—a very commendable plan.



Block Plan of Court Showing Relative Position of the Various Buildings

A Concrete Single-Apartment Court

Each apartment has an 8 x 8-ft. cement-lined cellar, with shelves for canned fruit, etc. Here is located the instantaneous heater which furnishes hot water for the little home.

These individual apartments are made of solid concrete with Spanish tile roof, etc., and the cost of each is about $1,500.

The entire court is of a neat, trim order. Wherever possible concrete and cement were used, and this contrasts nicely with the green of the grass and shrubbery. The only entrance to the court from the street is at the center of the lot. From the entrance two 3-ft. sidewalks run the entire length of the court, between which is a 3-ft. strip of lawn. All sections of the court not occupied by cement are taken up by well-kept lawn. At the rear of the court is a cement "plaza," which is for the use of the occupants of the court. This "plaza" is surrounded by flowers and trees of different kinds, and in its center is a mound. From out of the center of this mound rises a cement standard, bearing a 10-in. frosted glass globe, which in turn contains a 40-candle power electric lamp. This standard is identical with the two seen at the court's entrance, one of which is at either side of the sidewalks.

This little individual apartment court is located at Hollywood, Cal., and is considered one of the "exclusive" home places of this city.

Wages in Building Trades in England

Figures Covering the Leading Cities in England and Wales and Affording Comparison with Building Wages in America

WHILE the building situation on the other side of the water has shown no unusual degree of activity during the past year, a study of the prevailing rates of wages in the various branches of the industry in the principal towns of England and Wales shows that on the first of May a number of advances had taken place as compared with August, 1913. Just what these changes have been can readily be ascertained by comparing the figures in the accompanying table with those which the reader will find in our issue for October of last year. This table is taken from the London *Builder* of May 8, which states that while every endeavor has been made to insure accuracy it cannot be responsible for errors that *may* occur.

If he desires to compare the prevailing rates of wages in England and Wales with those which prevailed in this country a year ago the reader can do so by referring to the issue of *The Building Age* for September, 1913.

In order to convert the rates of wages paid abroad the reader should consider an English penny as the equivalent of two cents in American money.

Table of Wages in the Building Trades in Leading Cities of England and Wales

	Masons	Bricklayers	Carpenters, Joiners	Plasterers	Slaters	Plumbers	Painters	Masons' Labourers	Bricklayers' Labourers	Plasterers' Labourers
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Newcastle	10	10	10	10	10	10	9	6¾	6¾	6¾
Sunderland	10	10	10	10	9½	9	9	6¾	6¾	7
Darlington	9	9½	9	9½	9½	9	7½	6½	6½	6½
Stockton-on-Tees	9	10	9¾	10	10	9¾	9	7	7	7½
Bradford	10	10	9	9½	9½	10	8½	7	7	7
Halifax	9½	9	8¾	8½	8½	9	8¼	6½	6½	6½
Hull	9¾	9½	9½	9½	9½	9½	8½	7	7	7
Leeds	10	10	9½	9½	9	9½	8	7	7	7
Sheffield	10½	9½	9¾	9½	9½	9½	8½	6½	6½	6½
York	9	9½	8¾	9½	9½	8½	7½	6½	6½	6½
London	11½	11½	11½	11½	....	1s.	9	8	8	8
Brighton	8-9	8	8	....	....	....	....	....	....	....
Portsmouth	9½	9½	9½	9½	....	8½	7½	7	7	7
Southampton	8½	9½	9½	8	....	9½	8½	6½	6½	6½
Maidstone	9	9	9	9	9	9	8	6	6	6
Bristol	9½	9½	9½	9½	....	9½	9	6½	6½	6½
Plymouth	9	9	9	9	....	9	7½	6	6	6
Bath	7½	7½	8	8	7½	7½	7	5 5½	5 5½	5-5½
Cheltenham	8½	8½	8½	8¼	....	8¼	7¾	5½	5½	5½
Exeter	8	8	7½	7½	7½	7½	6½	5	5	5
Gloucester	7¾	8½	8½	7¾	7¾	8¼	7¾	5¾	5¾	5¾
Hereford	7½	8	7½	8	7½	7	6½	5	5	5
Stroud	7½	7½	7½	7½	7½	7½	7	5	5	5
Blackburn	10	10	9¾	9	9½	9½	9¼	6½	7	7
Bolton	10	10½	10	10½	9½	10	9	....	....	....
Liverpool	11	11	11	11	10	10½	9½	6½	6½	6½
Manchester	10	10½	10½	11	9	10	9½	6½	6½	7½
Oldham	10	10½	10	9½	9	10	9½	6	7	7½
Preston	9½	10	9¾	9	8½	9	8½	5½	6	6
Birmingham	10	10	10	10¼	9	10¼	9	7	7	7
Derby	9½	9½	9	9	9	9	8	6	6	6½
Leicester	9½	9½	9½	10½	9	9½	9	7	7	7½
Nottingham	10	9½	10	10½	9	9½	9	7	7	7½
Norwich	8	8	8	8	8	8	6½	5	5	5
Cambridge	9	8½	8½	9	8	9	7	5½	5½	5½
Oxford	9	8	8½	8½	8	8½	7	6	6	6
Southend	9	9	9	9	Piecework	9	7	6	6	6
St. Albans	9	9	9	10	8½	9	8	6	6	6
Grays	....	10	10	....	....	9½	8½	7	7	7
Cardiff	9½	9½	9½	9½	9½	9½	8½	6½	6½	6½
Swansea	9	9	9	9	8½	9	8½	6	6	6
Newport	9	9	9	9	8½	8½	8½	6	6	6
Chatham	8	9	9	9	9	8½	7	6	6	6
Birkenhead	11	11	11	0½	10	10	9½	6½	6½	6½

The mason's rate given is for bankers; fixers usually ½d. per hour extra.

Public Comfort Stations

The National Committee of the Confederated Supply Associations has recently issued an interesting circular, urging upon municipalities the establishment of public comfort stations.

The circular shows the need of such public conveniences, which should be opened day and night throughout the year to all classes.

It points out that public comfort stations are not of recent origin in European countries, as England, Germany, France and Belgium and other countries have long since recognized the need of such establishments for the convenience of the people and are to be found scattered throughout leading cities.

It is interesting to note that New York appears to be the leader among the cities of this country, and also claims to have established the first institution of the kind in Astor Place, May, 1889.

Attention is called to the fact that most cities, many of them considered beautiful, are well supplied with hotels, restaurants and saloons which men, women, girls and boys are too often forced to make use of, because of the absence of necessary public comfort stations.

Cottage for a Water Front Location

A Cozy Type of Dwelling in Which the Exterior Is of Stucco Applied to Metal Lath

THE subject of our colored supplemental plate this month is a cottage of the bungalow type especially adapted for erection upon a site fronting the water. While not pretentious in character the architectural treatment involves a number of interesting features, whether viewed from the angle of the architect or from that of the owner. One of the noticeable features is the private porch at the end of the house, this being of such a nature that it may be screened in the summer months and used for a dining room, or glazed in winter, thus making a conservatory.

Site Is on a Side Hill

Owing to the fact that the site is on the side of a hill there is a cellar under the entire area of the house and this contains furnace with considerable storage room. There is also sufficient space in a portion of the cellar for a future garage if desired and it would be an ideal place to keep a small runabout or automobile.

On the main floor there is just at the left of the entrance hall a large living room, the feature of which is the open fireplace and mantel with cobblestone facing and a tile hearth. The dining room portion, which is at the extreme left, is separated from the living room by a screen which can easily be removed, thus making one large apartment measuring 12 x 22 ft. in plan. The enclosed porch is reached through French casement doors. A feature of the dining room is the built-in sideboard.

Arrangement of the Rooms

At the right of the entrance hall are two sleeping rooms with clothes closets and about midway of the house is the main flight of stairs leading to the attic wherein is located a bedroom and a child's room. Underneath the main flight are the stairs leading to the cellar. In the rear is the kitchen and adjoining it on one side is a bath room and on the other a sleeping room. The arrangement is such that one may pass from the kitchen to the front door without the necessity of going through any other rooms and there is also direct communication with the dining room end of the living room, but with two doors intervening, thus keeping out odors from the kitchen. All bedrooms are of good size and amply lighted and ventilated. There is only one line of plumbing necessary to supply the kitchen and bath room fixtures.

According to the specifications of the architect the footings are of concrete of a 1:3:5 mixture of cement, sand and broken stones and are 10 in. thick and 22 in. wide, allowing 6 in. to project on either side of the foundation walls which in turn are 10 in. thick and of the same mixture as footings.

The exterior walls are of 2 x 4 studs doubled at all openings, the outside frame being covered with 1 x 9-in. sheathing laid diagonally. On this is placed three-ply building paper over which are nailed 1 x 2-in. furring strips. To these strips is attached the metal lath carrying the stucco finish which consists of two coats. The scratch coat is ½ in. thick outside of the lath surface and consists of a mixture of one part Portland cement, three of sand and not more than 10 per cent. of lime putty. The finish coat is ¼ in. thick and consists of one part cement, two of sharp sand and three of pebbles for rough finish. The finish surface is of a light cream tint. The roof has 2 x 6 in. spruce rafters laid 20 in. on centers and covered with shingle lath upon which red cedar shingles are laid 5¼ in. to the weather with a heavy joint every third course.

The Framing Timbers

The first floor timbers are of 2 x 10 in. spruce and the attic floor timbers 2 x 8 in. placed 16 in. on centers and stiffened with rows of cross bridging spaced 6 ft. apart. The interior partitions are of 2 x 4-in. studs placed 16 in. on centers, doubled at all openings and strengthened with rows of cross bridging. The first story rooms have double floors, the sub-floor being 1 x 9-in. boards and the finish floor of ⅞ x 2½-in. North Carolina comb grain pine. The attic flooring is of ⅞ x 2½-in. North Carolina pine, flat grain. The exterior cornice, rails, brackets, trim, etc., are of white pine.

All interior trim is of cypress except the kitchen and bath room, which are finished with white wood enameled white.

The rooms are plastered with three-coat work and all have a sand finish except the kitchen and bath room, which are left with a smooth finish.

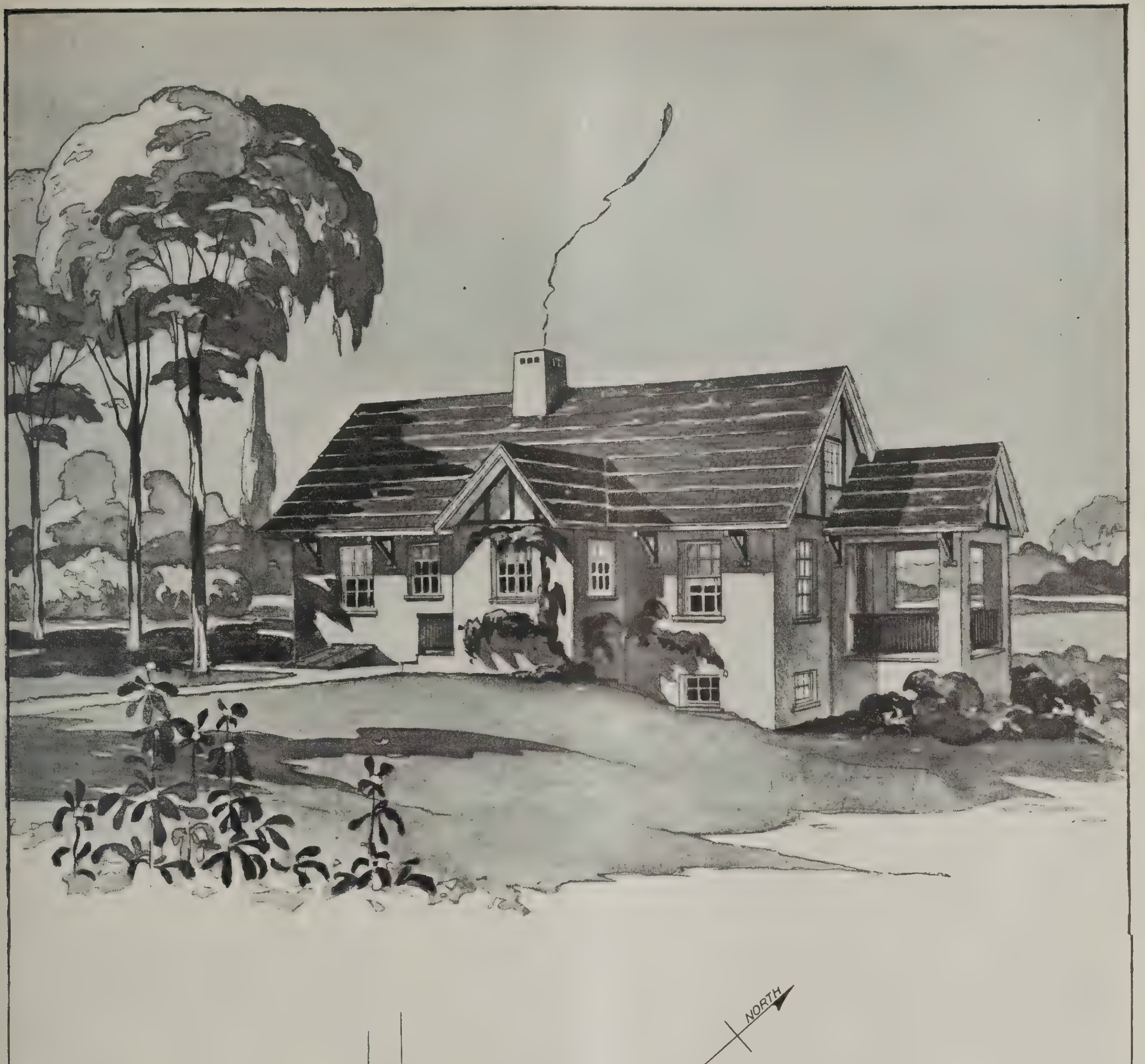
The Bath Room and Kitchen

The bath room floor is of tile and the side walls are covered with white tile to a hight of 3 ft., starting from a sanitary cement base with 3 x 6-in. white glazed tile and finished with a tile mold. The fixtures of the bath room are porcelain enameled, while all exposed pipes are nickel plated.

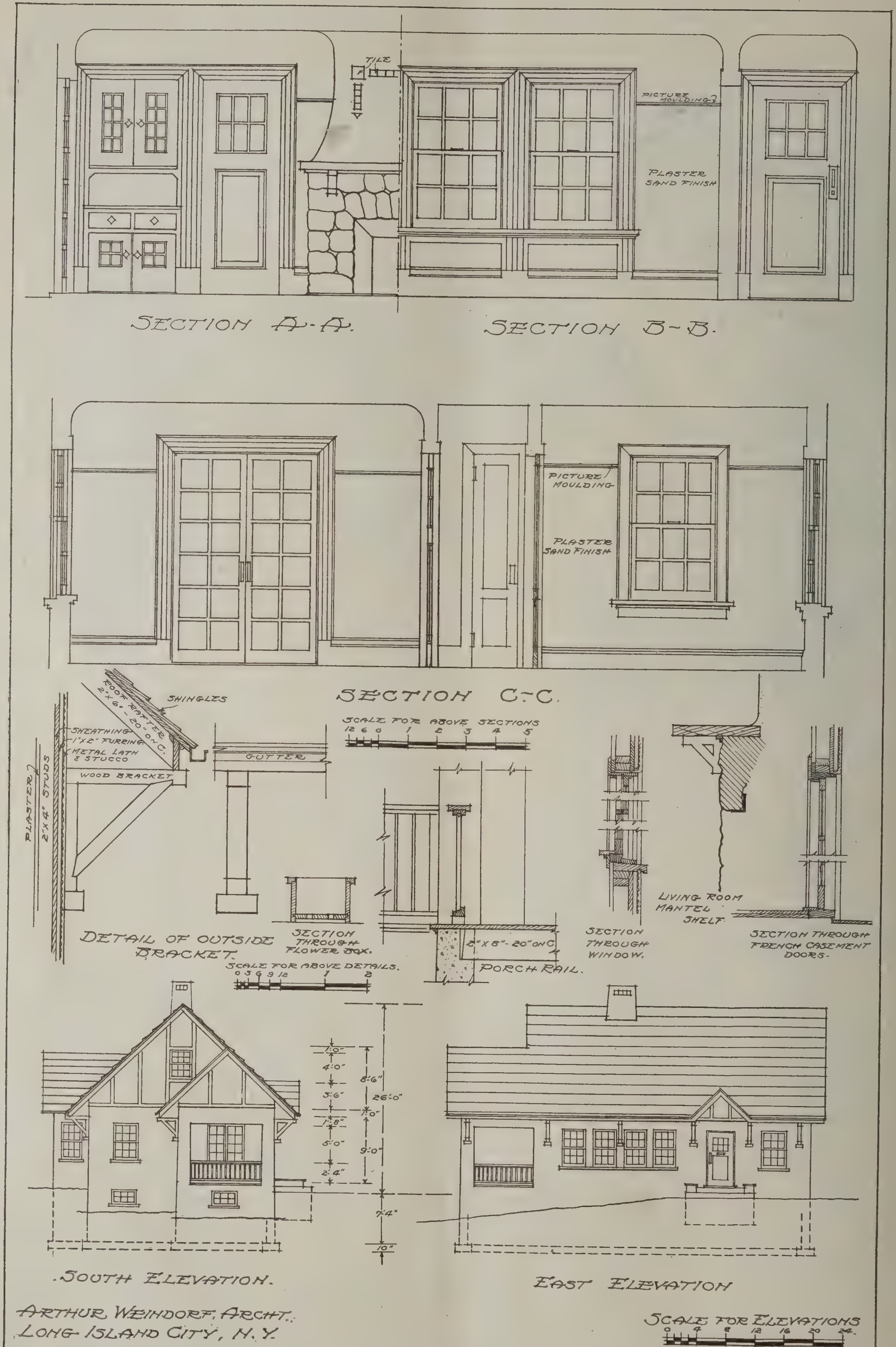
In the kitchen is a two-part soapstone wash tray and an iron enameled sink with brass fittings, all pipes being left exposed. Connections are made with the hot water boiler over the range and all fixtures are supplied with hot and cold water.

The house is heated by hot air furnace with registers located in all rooms and halls except the kitchen. The exposed parts of the registers are finished to match the hardware.

All exterior trim is painted three coats of white lead and linseed oil, while the roof shingles were dipped before laying in shingle stain. The kitchen bath room trim has three coats of enameled paint.



Plans and Perspective Showing Rear Treatment of Cottage for a Water Front Location



Miscellaneous Constructive Details of Cottage for a Water Front Location

ARTHUR WEINDORF
•1914•

The house is piped for gas and wired for electricity with outlets provided in all rooms for combination lighting fixtures of an antique finish. The hardware throughout the house is of antique brass finish.

Estimate of Cost of Labor and Materials

The estimate of cost here presented is based on a cubic contents of 27,780 cubic feet at a unit price of 18 cents per cubic foot. The more important items are as follows:

Excavating and grading	$100
Masonry, including chimney, concrete cement work, etc.	450
Interior and exterior plastering	630
Tile work	50
Lumber bill, mill work and carpenter labor	2,500
Hardware (finish)	75
Painting, staining and tinting	200
Metal work	110
Plumbing and gas fitting	375
Heating, by hot air	250
Electric wiring and bell work	90
Combination lighting fixtures	70
Total cost	$4,900

The above figures include the 10 per cent. profit of the contractor. The architect states that the house here shown can be built with an exterior of shingles instead of stucco on metal lath for $4,500.

The plans for this cottage were prepared by Architect Arthur Weindorf, Long Island City, New York, or care of *The Building Age*, 239 West Thirty-ninth Street, New York City.

◆

A Feature of Steel Frame Construction Work

Just at this season of the year when the youth of the country, as well as the elder male population, are daily working themselves into a frenzy over baseball, discussing batting records of this, that or the other player and the pitching ability of Mathewson, Johnson, Bender or Caldwell, it is interesting to call attention to another style of pitching which can be seen almost any time while the steel framework of a skyscraper or other structure is being put together. The question naturally arises could any baseball experts pitch and catch red hot rivets standing on planks on the eighteenth story of a rising skyscraper as cleverly as they juggle with the baseball in a match game?

It is just as absorbing and interesting to many folks to watch ironworkers pitch and catch red hot rivets as it is to watch two baseball teams in action. Undoubtedly it requires a great deal of cleverness. Then danger in two forms is ever near the ironworkers. They may have a bad fall or be severely burned by a misdirected red hot bolt. Judging by the manner in which they work, one would imagine they had as many lives as a cat.

A new steel skyscraper is being erected at Franklin, White and Lafayette streets, in New York City, and the ironworkers engaged in putting the frame together are always successful in causing a crowd to gather by their expertness in pitching and catching red hot rivets. Spectators watch the ironworkers hour after hour.

The men who are in charge of the actual riveting are continually supplied with red hot bolts by a young man who stands near them with an empty keg in his hands. His duty is to catch the flying rivets as they are thrown through the air by another young man who heats the rivets at a small furnace situated some distance from the man with the barrel. The pitcher never makes a wild pitch and the catcher never a miss, hence an "error column" on the score card is superfluous.

◆

A Trades School in Boston Harbor

A trades school of which comparatively little is heard is that which is located on Thompson's Island in Boston Harbor about three miles from the foot of State street, Boston. It probably represents the oldest enterprise in the practical training of boys in this country. It is a private enterprise known as the Farm and Trades School and receives boys not less than ten nor more than fourteen years of age. They must be of good moral character, in fair physical condition and not lower than the sixth grade in the grammar school. The parents, guardians or friends of the boys are asked to contribute something toward their support if they are able, but boys are not rejected on account of inability of parents or friends to contribute toward their support.

The school was the pioneer in many of the educational features which are now common and thought to be indispensable in most of the schools for boys. Here Sloyd was first taught; here the part time plan of education under which boys study in school part of the time and learn some useful trade or occupation part of the time, has been a factor in the general plan of the school since it was located on Thompson's Island in 1833. The course of study in this school embraces four years' work. Up to the ages of fourteen or fifteen all boys receive a similar education. Above this age the boys are permitted to specialize somewhat in the direction in which their abilities tend. The boys attend school half a day and are employed at industrial work the other half. They are taught carpentry, cabinet work, wood turning, mechanical drawing, painting, blacksmithing, machine work in metal, printing, office work, farming, handling of boats and household duties. All classes are taught to do brush and pencil drawing from nature, drawing from memory and imagination, and perspective light and shade and water color. Sloyd is the basis of the mechanical teaching in the school and in the three upper grades there is practical study of meteorology.

Farming is a fundamental in the course of study at the school as by far the larger part of the 157 acres, of which the island consists, is allotted to the farm, comprising both arable and grazing land. The technical side of agriculture is presented to the pupils in lectures and experiments, both in the class rooms and on the farm. They learn by practical field lessons the preparation of the soil, planting the seed, cultivation, harvesting, rotation of crops and setting out and caring for all kinds of shrubs and trees, including practical demonstration in the mixing of chemicals for fertilizers. The use of farm machinery and tools, the care of animals and all other farm work is practically taught.

◆

Officers of the New York Society of Architects

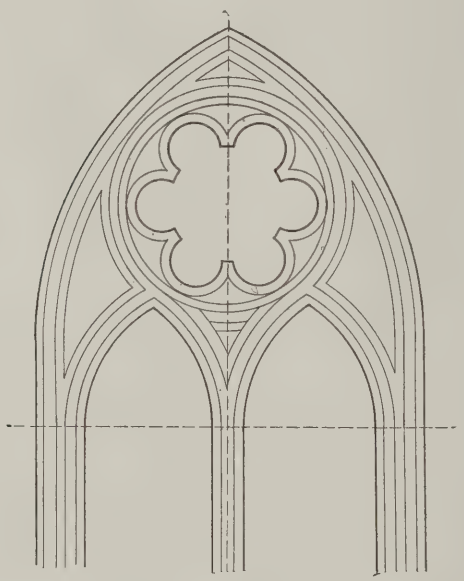
At the recent annual meeting of the New York Society of Architects the following officers were chosen: President, Constantine Schubert; vice-president, J. Reily Gordon; secretary, William T. Towner, and treasurer, Louis Berger.

Drawing Windows of Gothic Design

Some Suggestions for Laying Out Complicated Window Tracery in the Gothic Style of Architecture

By Alfred Auslander

WHEN the piers between the windows are very much reduced in size they are known as bars or mullions. In time these mullions became very small and were richly moulded and also were continued to follow around the openings above, so that they became the important part of the design, and there resulted what is known as *bar* tracery, illustrated in Fig. 17. Here it will be seen that the openings shown in Fig. 15 have been increased in size relatively to the enclosing pointed arch, until the pier between the windows has been reduced to a thin mullion, which has been moulded and been made to follow around the circle above. The bar has become the important member as against the openings. Gradually it was developed that the enclosing pointed arch over the grouped windows could be the structural arch between the piers and buttresses carrying the roof, and the wall underneath the arch became a mere filling in, and with the more general use of painted glass the windows were enlarged until they filled the entire width between the piers. In order to fill the space the windows became very elaborate. It was also discovered that there were many difficulties encountered in trying to fit together nicely the rigid geometrical forms and so to get over these troubles the geometric patterns gave place to easier and more flowing designs, which from their resemblance to the movement of flames were known as Flamboyant. See drawing on page 47. Later fewer curves were used and more rectangular figures, and this kind of tracery was known as Perpendicular. These Flamboyant and Perpendicular windows are more intricate and require special plates to properly illustrate them. The window tracery became a distinctive feature of Gothic architecture, and the various periods or styles can be perhaps most readily recognized by the designs of the traceried windows.



Drawing Windows of Gothic Design—Fig. 17—Showing What is Known as Bar Tracery

Before proceeding with the directions for drawing the window shown on the facing page there are certain general considerations that it will be helpful to note.

In the first place, the large pointed arch *A, B, C* may vary in its general proportions. It may be equilateral, lancet or obtuse. Having fixed upon certain proportions, the triangular space enclosed by the arch may be filled in various ways, and the divisions here shown having been determined upon, the proportions of these subdivisions may be varied. Thus the upper circle might be made larger or smaller, and the two pointed arches below the circle would necessarily have to be smaller or larger as required. If the upper circle were smaller, the two pointed arches below would have to be higher in order to meet or touch the upper circle.

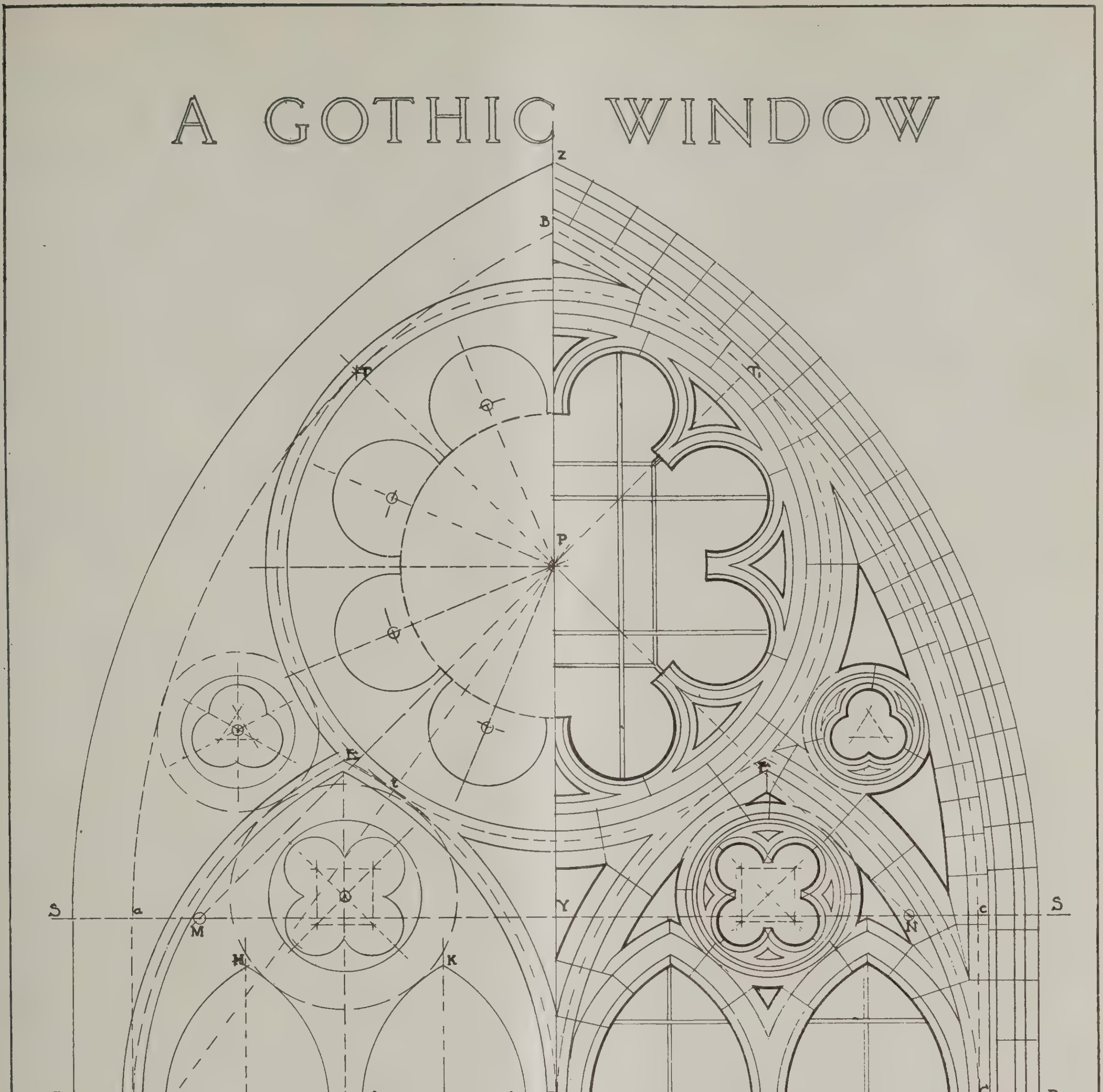
So that with the same arrangement of openings as shown in this window a number of different designs could be made differing only in the proportions adopted.

In designing such a window one would begin with a rough sketch drawn free hand showing approximately the arrangement desired, and then the exact location of centers and radii would be worked out with geometrical accuracy to conform as nearly as possible to the tentative lines of the rough sketch. In other words there are no very set and definite proportions such as were used for the orders in classic architecture.

This particular window is one from the French Cathedral of Amiens, and the right half of the outside view has been shown with joint lines of the stone work. The full length of the lower windows (see page 43 of the June issue) has not been shown, but they were about six times as high as they were wide. The window has been drawn to a scale of one-half inch to the foot. The size of the window may be indicated by stating that the lower narrow windows are each about four feet wide.

In order to simplify the drawing and explanations only the right half has been completed, and on the left side of the central line *X, Y, Z* are shown the important structural lines and center used in drawing this window.

At right angles to the central line *X, Y, Z* through *Y* draw the line *S-S* as a springing line for the large arch. From the center *N* and *M* on this line, and with radii equal *Na* or *Mc* describe the



Drawing Windows of Gothic Design—An Interesting Example—By Alfred Auslander dotted line arcs *a-B* and *c-B*, intersecting at *B*. From *M* and *N* draw lines at 45-deg. angles with *a-c* and where these lines intersect at *P* on *X-Y-Z* will be the center of the large upper circle, the radius of which will be *P-T* the distance from center *P* to the point *T* where the 45-deg. line *N-P* cuts the arc *a-B*. The arcs *a-B* and *c-B* are tangent to the circle at points *T* and *T-T*.

Draw the horizontal line *R-R* as a springing line for the smaller pointed arches, and draw the vertical lines *a-A* and *c-C* to complete the pointed arch *A, B, C* started as *a-B-c*. From *L* as center and *A-L* as radius describe the dotted arc *A-E* and from *G* as center and *G-D* as radius describe arc *D-E*, intersecting arc *A-E* at *E* and giving pointed arch *A, E, D*. Similarly draw arc *D, E, C* the opposite half.

It will be seen that an essential feature is that the springing line *R-R* and the centers *G* and *L* be so located that the arc *D-E* will be tangent to the upper large circle as at point *t* where *G-P* cut the circle. The line *E-e* is a vertical line dividing the arch *A, E, D* into halves. The pointed arches *G, H, I* and *J, K, L* are equilateral; that is, the radius used is equal to the width of the arch. Thus from *G, I, J* and *L* as centers with radius equal to *G-I* or *J-L* describe the arcs *G-H, I-H, J-K* and *L-K*.

Above these pointed arches *G, H, I* and *J, K, L* it is necessary to draw a circle that shall be tangent to four arcs, namely *A-E, D-E, I-H* and *J-K*. Likewise the circle containing the trefoil must be drawn tangent to three arcs, namely, *a-B, A-E* and the large upper circle whose center is *P*. The geometrical solutions for these tangent circles is too complex to be given here. The centers should be found graphically by testing with the compasses. We have already discussed the trefoil and quatrefoil so that it should not be necessary to say more here than that the circles of the former has its centers at the extremities of an equilateral triangle and those of the latter from a square.

As to the small circles around the upper large circle it will be seen that they will be found on radii that divide the large circle into eight equal parts. The distance of these centers from the center *P* depends upon the particular design adopted.

From the centers given, the additional arcs are described to form the moulded stone work as shown. The straight lines shown in the upper circle and the narrow windows below indicate the iron bars necessary for the support of the glass.

In the second full page drawing there is shown a Gothic window of the Flamboyant period from the court house in the French city of Rouen. This is a much smaller window than the one given on page 43 of the June issue, being only about five feet wide instead of nearly twenty.

To draw this window begin with the central vertical line *X-Y*, dividing the window into two equal halves. On the springing line *A-B* locate two centers *A* and *B* from which describe the four outside arcs intersecting near *X* to form the large pointed arch enclosing the bar tracery over the coupled windows below.

Having determined the width (2 ft. 4 in.) of these windows and of the mullion (5 in.) between, draw central vertical lines passing through *5* and *6* and dividing the width *2″-4′* in half. Locate the centers *1-2* on the line *A-B* so that *1-C* = *1-H* = *H-2* = *2-D* and similarly for centers *3* and *4* and describe semi-circles *C-F-H, H-G-D*, etc., with radius equal to *1-C*.

From the centers *5* and *6* (chosen arbitrarily) and with same radius as before describe circles as *F, I, J, G*, intersecting the semi-circles in the cusp points *F-G*, etc. The arcs *I-E* and *J-E* are arcs of circles tangent to the circle *F, I, J, G* at the points *I* and *J*, and drawn from the centers *7* and *8* with radii *7-I* and *8-J*. We now have the inside lines of the trefoil head *C, F, E, G, D*. The next circumscribing lines are of course drawn from the same centers, namely, *1, 2, 5, 7* and *8*. The corresponding centers for the right hand window are *3, 4, 6, 9* and *10*.

The ogee curves *K, L, M* and *O, N, M* are described as follows: the arcs *K-L* and *L-M* are arcs of circles tangent to each other at the point *L*, drawn from centers *17* and *18* with the radii *17-L* and *18-L*, and likewise *O-N* from center *15* with radius *15-N* and *N-M* from center *16* with radius *16-N*. The corresponding centers for the right hand foiled window are: *11-12* and *13-14*. It will be seen that the centers *15* and *17* and *18* and *16* are symmetrically disposed with reference to the central line *E-H*, and of course it is the same with centers *13-11* and *12-14* as to the central line through point *6*.

For the figure *P, Q, S, R* proceed as follows:

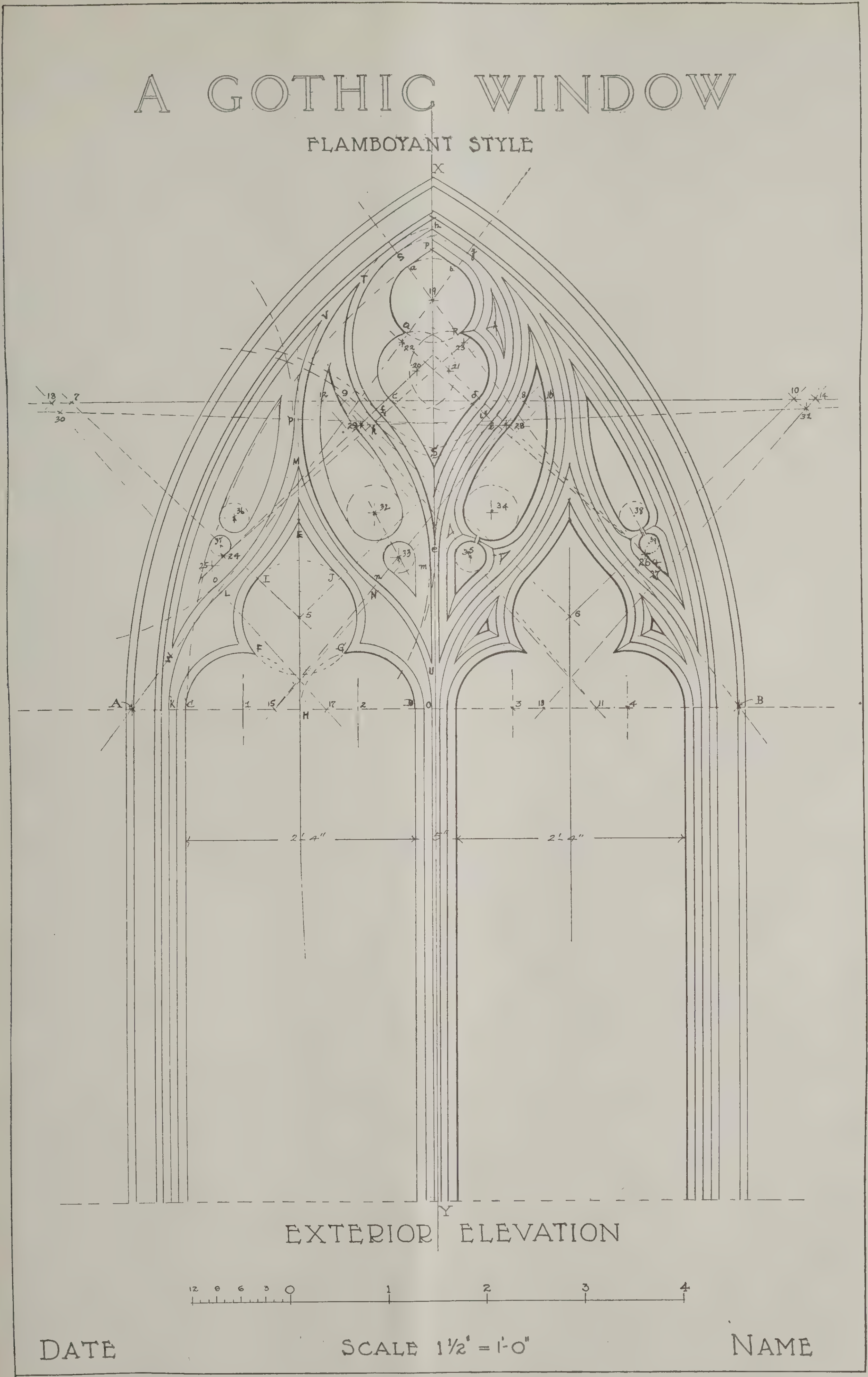
The circle *a, Q, R, b* should be tangent to the large dotted arc *C-P*. The tangent point *a* will be on a straight line passing through *B* and *19*. The size of the circle is arbitrary as likewise is true for the two lower circles. The lines *a-P* and *b-P* are arcs of circles described from centers *B* and *A*. From centers *20* and *21* with equal radii *20-c* and *21-d* describe the circles intersecting the upper circle in the cusp points *Q* and *R*. The line *C-S′* is the arc of a circle, with center *24* and radius *24-c*, tangent to circle *C-Q* at *c*. The line *d-S′* is described from center *26*, with radius *26-d* equal to *24-c*.

Next for the ogee line *e, f, g, h*. This line is made up of arcs from three tangent circles. Thus *s-h* is the arc of a circle described from *B* as center with radius *B-s* equal to *B-K* and tangent at *s* to a circle drawn from center *23* with radius *23-s*, which circle in turn is also tangent at *f* to a circle described from center *24* with radius *24-f* and giving the arc *f-e*. Similarly from center *A* describe arc *j-h*, from center *22* arc *i-j* and from center *26* arc *e-i*.

The arc *k-T* is described from center *23* and *k-m* from center *25*, the corresponding centers the ogee on the right of central line *X-Y* being *22* and *27*. The line *m-U* is a straight vertical line tangent to *k-m* at *m*.

The ogee line *U-n-T* is composed of the arcs of circles tangent to each other at *n*, the arc *n-T* being part of circle described from center *28* with radius *28-n*, and the arc *n-U* described from center *15* with radius *15-n*. The corresponding centers for ogee on right of line *X-Y* arc *29* and *11*.

The curve *w-v* is the arc of a circle described from center *B* with radius *B-k*. The compound curve *W-o-p-V* is composed of the arcs of three tangent circles. Thus *W-o* is described from center *17*, *o-p* from center *30*, *p-V* from center *28*, the



Drawing Windows of Gothic Design—The Flamboyant Style—By Alfred Auslander points of tangency being *o* and *p* on lines drawn through centers *30* and *17* and *30* and *28*. The corresponding centers for similar figure on right of *X-Y* are *13*, *31* and *29*.

The centers *32*, *33*, *34*, *35*, *36*, *37*, *38* and *39* hardly need explanation as they are for small circles that must be tangent to arcs described from centers already located for curves similar to those already described.

Heat Transmission and Insulation of Buildings

In the course of his address before the American Society of Heating and Ventilating Engineers at its July meeting in Cleveland, President S. R. Lewis dwelt upon the application of the idea of insulation against heat and cold to our buildings. He pointed out that while we spend time and dollars as well as skill and genius in elaborating the heat transmitting appliances and the fuel-consuming devices we give no more than a cursory investigation of the type of construction of building and no effort to influence its construction so as to reduce the heat losses. This he regarded as a crime against future generations. Continuing, he said:

There are instances available where 5 per cent. of the cost of the building, expended on heat transmission insulation rather than on a larger heating plant, saved in fuel charges alone its cost within three years. The field this opens up is almost unexplored. We know, however, how much more efficient as regards heat insulation is an ordinary sawdust packed icehouse than an ordinary dwelling, and how much longer heat is retained in an ordinary fireless cooker than in any part of the best insulated transmission department of an ordinary heating plant.

Greatest Enemy of Good Ventilation

We know that poor insulation of walls and windows is the greatest enemy of good ventilation, preventing proper diffusion of the fresh air. We know that tight windows or storm sash permit of very considerable fuel savings. We know that warm winter buildings are cool summer buildings. We know that a $10,000 investment with a 5 per cent. interest charge is better for the borrower than an $8,000 investment with a 20 per cent. interest charge. We seem, however, unable to get perspective enough to use this knowledge, else buildings with rattling windows and no storm sash, thin walls, cold attics and cellars, direct-indirect radiators, unduly high ceilings, single slab roofs, etc., coupled with the most elaborate and expensive heating plants, would cease to exist.

In our practice as engineers are we losing perspective in regard to the location in the room of the heat source? We learned, very early in our experience, that the heat transmission varies, among other things, in a certain proportion as the difference in temperature between the hot and cold objects varies. Is it then the best practice to place the hottest thing in a room against the coldest object? The dean of one of our greatest engineering schools agreed with me that in most instances the radiator location was far more a factor of the convenience of the occupants of the room than of their comfort. Granted reasonably tight windows and fairly well insulated walls, the radiator may be alongside the inside wall as satisfactorily as alongside the outside wall. May not the radiator be smaller—will not the piping be less expensive—will not the fuel cost be lower, if this procedure is carried out consistently?

Is it not a loss of perspective to cling to the idea that air for ventilation shall all have been heated prior to its entry to a room? Our belief in this is traditional. Is it based on truth? It has been demonstrated that unheated air may be introduced into rooms under certain peculiar ideal conditions, and that under these conditions the air feels better to us than air which has been heated. This process has proven good for street cars. Shall we not hope for the development of the process for buildings, so perfected that it shall operate continuously and effectively? I believe that it will surely follow the construction of properly insulated buildings, and that we cannot approach perfect ventilation until we build insulated buildings.

Production of Hudson River Brick in 1913

The Hudson River region produced 1,025,308,000 bricks in 1913, valued at $5,636,061, according to a statement by Jefferson Middleton, of the United States Geological Survey. Large as these figures are, they show a decrease of 207,879,000 bricks and $1,497,116 in value compared with 1912.

New York City is the leading market for common brick in the United States, hundreds of millions of brick being used there annually. The principal source of this supply is the Hudson River region, extending from New York to Cohoes on both sides of the river. Bergen County has also contributed largely to this market, and within the last two years the Raritan River region, located in Middlesex County, has sent the larger portion of its output of common brick to the New York market. Connecticut also is at times a factor in the New York brick market. The water transportation enjoyed by the Hudson River yards and those located in the Hackensack and Raritan districts, however, gives them a great advantage, and it is only when prices are high—say $7 a thousand—that Connecticut brick can profitably enter New York City market. As prices were unusually low in 1913, few, if any, Connecticut brick were shipped to New York during that year.

The principal use of the brick made in the Hudson River region is and probably always will be in the building industry of New York. Notwithstanding the fact that the expenditures for building operations in New York City decreased about 35 per cent. in 1913 compared with 1912, the number of brick marketed decreased less than half as much, thus showing that the use of brick in building is expanding and that they are also being used more extensively than ever before for other purposes, such as sewers and subways. The "back to brick" campaign is apparently having its effect, not only on the demand for common brick, but also on that for the higher grades of building brick and other clay products, such as hollow building brick, tile and terra cotta.

The average price obtained for bricks in 1913 was $5.50 a thousand.

Laying Out Two Types of Brick Arches

A Mason Contractor's Method of Laying Out the Three-Centered and the Semi-Elliptical Arches

By Herbert Bircher

IT has been my experience that a good many bricklayers possess little practical knowledge of arches. There are two arches concerning which more or less misunderstanding exists and one is often confused with the other. These are the three-centered arch and the semi-elliptic arch. When the bricklayer is called upon to build of pressed brick either of these he is often puzzled how to place a line so that his joints will conform to the curve of the arch.

Referring to the accompanying sketches, Fig. 1 shows the simpler or three-centered arch. The radii are generally marked on the plans and it is therefore an easy matter to drive nails into the frame at *A* and *B* to which to tie the line for the ends of the arch. The center is easily found and a board is nailed across the frame as at *C*. The diagram here presented shows the construction for either stone or brick.

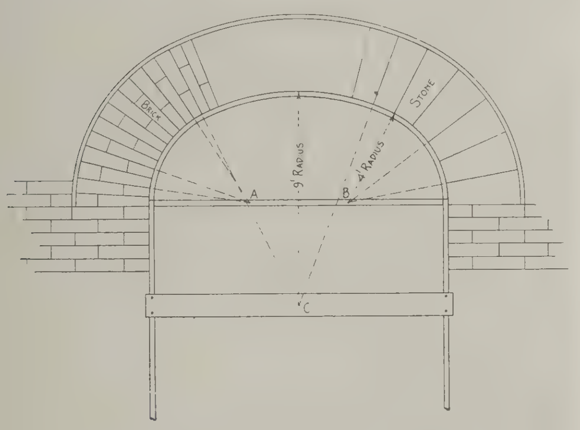


Fig. 1—Laying Out a Three-centered Arch

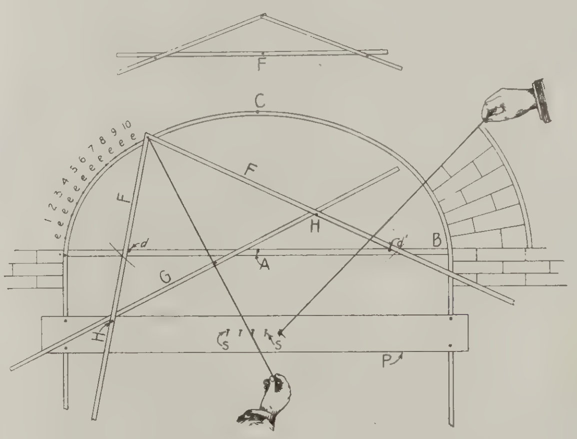


Fig. 2—The True Semi-elliptical Arch

Laying Out Two Types of Brick Arches—By Herbert Bircher

In Fig. 2 is shown the true semi-elliptical arch and the one which it is more difficult to build. First take a stick and mark on it the distance from *A* to *B*. Place one end at *C* and indicate on the frame where the marks occur as at *d* and *d'*.

Make a frame as shown by the small sketch *F* and let it rest on two nails driven at the points *d* and *d'*. The sticks composing the frame are fastened loosely together and the top is moved from point to point where the courses have previously been laid out with a pair of dividers as at *E*, *E*-1, *E*-2, *E*-3, *E*-4, etc. The cross stick *G* is laid on the nails *H* and *H'* driven at equal distances from the point. Find the center of the stick *G* and make a mark; slide each way to get it centered between the nails and hold the line from the point of the frame *F* to the center as shown. Drive small nails where the line crosses the board *P*. Repeat for every joint and the result is a practical method of obtaining the voussoir joints of the arch.

This is a method which I have never seen published nor heard of its being used before. I have placed the nails in position for one of these arches in a very short time as compared with other methods, the idea being to bisect the angle formed by the sticks *F*-*F*.

The foreman can place the board *P* and drive the nails for the line as at *S* before the frames are set in place. Then they are all ready when set in position. If the under side of the cross stick *G* is notched it will not slide so easily on the nails at *H* and *H'*.

When all the nails are in place the bricklayer ties one end of a line to them, starting at the end nail and working toward the center of the frame, holding the other end of the line in his hand as at *K* in order to get his joints correct.

◆

The Exhibition of work of the pupils of the Baron de Hirsch Trade School, which was given on the afternoon and evening of Wednesday, July 8, at 222 East Sixty-fourth Street, New York City, was a most creditable showing. The specimens of handicraft displayed by the various classes were intensely interesting to those concerned in the development and training of the youth of the country and the School Committee and Superintendent are to be congratulated on the good work which has been accomplished.

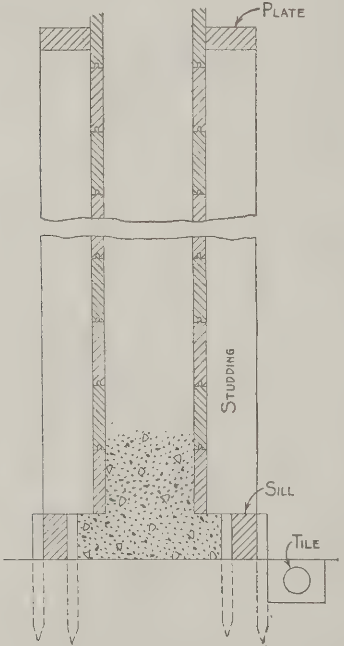
CORRESPONDENCE

A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Building "Forms" for Foundation Walls

From G. L. McM., Tacoma, Wash.—I have read with much interest the articles entitled "When the Builder Mixes His Concrete," by "Hee H. See," and especially that portion in the April issue relating to the making of "forms" for foundation walls. I am inclined to the opinion that the method which prevails in this section of the country is considerably better than the one described by the writer in question in the April number of the paper.

It will be found much more accurate, besides being easier and quicker to put down 2 x 4 sills set edgeways, as shown in the drawing, than to drive stakes, as shown by "Hee H. See." The sills can easily be put down nearly level and can be straightened and kept in place by small stakes, which will not need to be removed when the concrete is poured. They should be flush with the outside of the studding, as shown, which will leave a footing about 4 in. wider than the wall.



Building "Forms" for Foundation Walls

For a basement wall the studding should be cut the right length for partition use in the building and then there will be no waste in using them for the forms. The forms can also be sheeted with shiplap, which can afterwards be used for sheeting the walls or for floor lining, and there will be very little waste. For a basement wall of ordinary hight studding 2 ft. apart will be close enough and if shiplap is used for sheeting it will only need to be nailed to every alternate stud and only on one edge. A saw kerf through the tongue will make a place for the ties, which should be cut to length and put in as the outside wall is sheeted, then brought across, fastened and twisted as the inside wall is sheeted up.

It will be found much more economical and better to build forms for both sides of the walls than to try to use an earthen bank for one side, as by so doing most of the excavating can be done with a team and scraper much quicker than the wall can be cut down to a line by hand, and also there will be a chance to get at the outside of the wall to plaster it or apply a waterproofing coat.

There is a very erroneous opinion held by some people that concrete walls are waterproof, which is not the case, unless they are made of very rich mixture and of very fine aggregate. It is always safer to make sure by applying either a coat of cement plaster, or coal tar or some such material before the earth is filled in against the wall.

Both sides of the wall should be sheeted up, the ties twisted tight and the walls straightened and braced before any concrete is poured. It will be necessary to level only one side of the form to the hight of the wall and if the other is run up one board or so higher it will help in pouring the concrete. Small spreaders should be put in at every tie and the tie twisted till the spreader is tight. It will not be necessary to nail the spreader and they can easily be knocked loose and removed as the concrete reaches them. Another thing many omit is to leave the nail with which the tie is twisted in place, as if it is removed the tie will sometimes untwist and stretch as the pressure of the concrete comes upon it, leaving the wall uneven and crooked.

By having the studding cut to length a plate can be spiked on top, which will help to straighten the wall and keep it straight.

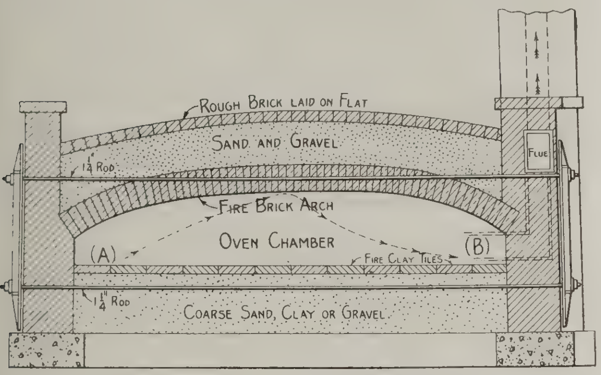
It will tend to keep the basement from becoming damp; also, if a course of 2-in. or 3-in. tile is laid clear around the wall a little below the bottom of the footing, as shown, covered with gravel and 1 or 2 in. of gravel put on the basement floor beneath the cement floor. The tile should be connected with the storm sewer or provided with some other outlet for drainage.

Construction of a Baker's Brick Oven

From O. B. M., Bronx, N. Y.—I enclose a sketch showing details that may prove of assistance to "W. S. W.," Beverly, Mass., who asked in the May issue of the paper regarding the construction of a bake oven. This oven, a cross section of which is here shown, is composed of four walls, the rear one being the rear wall of the building containing the flue. The side walls of the oven chamber are rather thick, that on the left being 16 in. and that on the right 24 in. The base or footings are of concrete of a 1:2:5 mixture.

The space inside the walls is filled with coarse sand and gravel topped with a layer of cinder cement concrete. On this the fire clay tile floor was laid dry, the tile being closely set edge to edge and breaking joints with full bond on every course.

The wrought iron tie rods and the cast iron reinforcing plates having been inserted and set, as shown, the entire oven chamber was filled in with clean sand, which being tamped down solid and all the corners filled up, was shaped with shovels and trowels to the approximate elliptic curve shown in the drawing. On this the arch was turned the skew backs having been previously formed in the opposite wall. Above this about 12 in. of sand was dumped and an extra ring of brick laid on flat. The work was of a first-class character, the prime object being to retain the heat in the chamber.



Construction of a Baker's Brick Oven

Wooden centers would doubtless serve just as well as the sand and can be burned out after the mortar has set, which by the way must be of Kaolin or cement fire mortar so as to be able to withstand the intense heat. The sand centers will require to be dug out with trowels and hoes.

The mortar of the arch over the oven chamber might advantageously be of plaster of Paris grout and cement and asphalt may be laid under the topmost tier of bricks to insure the certain retention of the heat.

Referring to the drawing the dotted line from *A* to *B* indicates the operation of the fire from the fire box, which we will suppose is set at *A* so as to give a fire travel from *A* to the back of the chamber and filling the entire space, after which it passes to the in-take of the flue at *B* and thence to the smoke stack and to the outer air.

When ovens are built in the ground, as, for example, under sidewalks in cities or under yards in the rear of houses, the rods and plates are omitted as the ground resists the lateral thrust of the arches and the walls cannot spread. The example illustrated was built on a cellar floor and having no side resistance required plates and tie rods.

Repairs for a Concrete Roof

From Roofer, New York City.—In all my experience on many concrete roofs, I never saw one where the builders depended on the concrete to be weather-resisting. Without exception, all are treated as ordinary roofs and are covered, as a rule, with Barrett's specification slag or gravel roofing, or perhaps first waterproofed as per Barrett's specification, and instead of slag or gravel either special roof tile or brick used for the top surfacing.

On a roof as steep as that mentioned by the correspondent in the June issue of the paper I would not fear expansion and contraction so much as that the stuff would all run down to the eaves in hot weather, and also I doubt if he can use as little per foot as he says, as it is hard to spread on concrete. Then again rain will wear away the asphalt in a hurry.

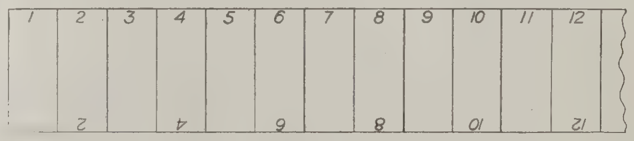
Speaking now of the asphalt running brings to mind that a gravel roof would also give some trouble on a steep pitch on account of sliding in as much as no nails are used and the adhesive qualities of the pitch or asphalt are depended on to stick it to the concrete roof.

There are manufactured stubby nails to fasten down the metal flashing to concrete and quite likely they could be successfully employed to fasten down the felt as if on a wood-sheathed roof. Or again instead of running the felt parallel to the eaves, the felt could be run out at right angles to the eaves, crossing at once the ridge to give a hold just as is done in waterproofing a wall. If the latter course is followed, it would be well to run the heavy special felt used in waterproofing instead of roofing felt and, if desired, the slag or gravel could be left off.

All the foregoing suggestions are costly and I gather from what he says of a pound per foot that he needs something reasonable in cost, so perhaps some of the ready roofing materials on the market would be suitable, using the nails suggested. No doubt some of the advertisers could furnish interesting information if asked for assistance and considerable data can be found in books on mill building, notably Tyrrells. However, I think this correspondent has the wrong idea and he had better look more thoroughly into the matter.

Gluing Up Wood to Prevent Springing

From J. B., Providence, R. I.—I am enclosing a sketch showing how to glue together two or more pieces of wood in order to prevent them from springing. The way I have seen this done is to split the wood and turn the pieces end for end, but to my way of thinking this is positively wrong. The proper way is to split and turn over one piece. This reverses the grain all the way and makes as perfect work as can be done.



Gluing Up Wood to Prevent Springing

The sketch represents the end of plank 2 to 4 in. thick or more, according to circumstances. It shows how to saw and glue the pieces in order to give the best results. The pieces marked 1 and 2 are glued together, then 3 and 4 and so on until all are glued in pairs. Then glue together as many of the pairs as may be required for the purpose. It is a good method for making straight edges, tongues to drawing squares, etc.

Various Kinds of Masonry

From Charles W. Killam, Department of Architecture, Harvard University, Cambridge, Mass.—The article entitled "Some of the Various Kinds of Masonry," by D. P. Barry and published on page 49 of the June issue of the paper, follows in general the definitions of Baker in his "Masonry Construction" and shows stone joints for heavy engineering work like retaining walls, bridge piers and dams rather than for building work. In the latter there are different names and altogether different methods of bonding. Mr. Barry's Fig. 2 called "coursed rubble," seems to me to be much too regular for rubble, and again, how much is coursed rubble used at the present day? I have only noticed one example in my experience and never any coursed broken or random ashlar.

His Figs. 4 and 6 designated as "ashlar work" show engineering ashlar and not building ashlar. The latter is commonly bonded by making alternate courses deeper than the others, say 4 in. for one, then 8 in. for the next or 8 in. and 12 in.

I should call his Fig. 8 "broken ashlar" in building work instead of "broken range" and would not continue the horizontal joints so long and would avoid the notches shown cut out of some of the stones.

The accompanying drawings show my own suggestions. I have included several different kinds of rubble as indicated in Figs. 2 to 7 inclusive, showing variations depending upon the way the stones quarry out and also upon the amount of dressing done upon the joints.

I show in Figs. 8 and 9 two types of broken ashlar, the one with the shorter stones indicating a certain regularity along diagonal lines. The coursed ashlar sketches, Figs. 10, 11 and 12 show the bond used in building work. I have omitted the anchors for the sake of clearness.

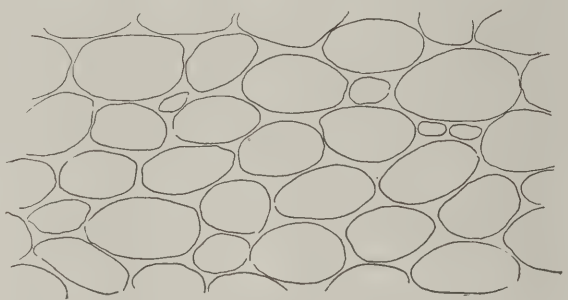


Fig. 1—A Good Example of Field Stone Work

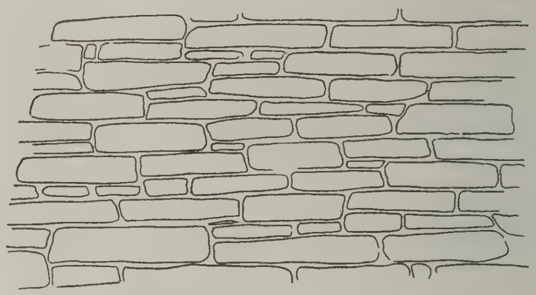


Fig. 4—Rubble—Stones Which Quarry Into Layers

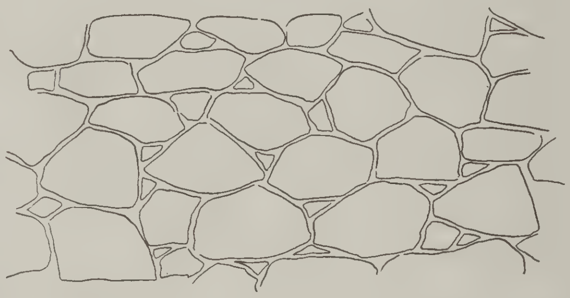


Fig. 2—Rubble—Stone Which Quarries in Irregular Shapes

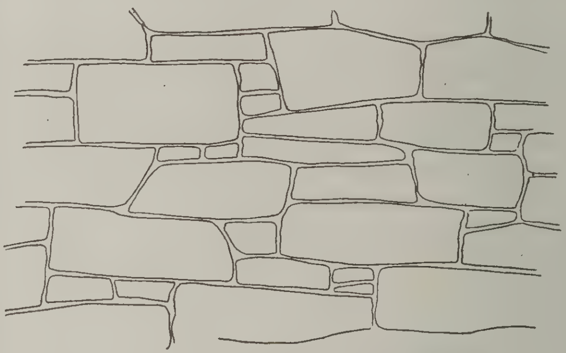


Fig. 5—Rubble—Hammer Dressed Joints

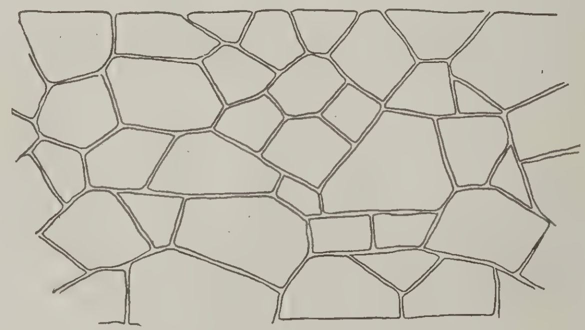


Fig. 3—Rubble—Hammer Dressed Joints—No Spalls on Face

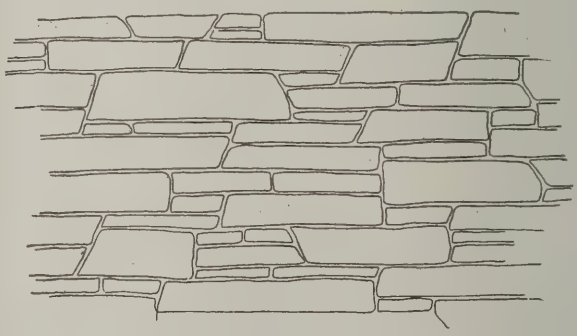


Fig. 6—Rubble—Dressed Joints—Part of It Builds Oblique

Some of the Various Kinds of Masonry—By Charles W. Killam

Rendering a Cellar Water Tight

From Contractor, Clinton Co., N. Y.—I would suggest to "H. L. M.," Pawling, N. Y., who asked in the May issue how to render a cellar water tight that he can remedy his trouble by the application of a plaster coat of oil-mixed mortar in the proportions of one part cement, two parts sand and 5 per cent of oil, mixed with enough water to form a rather stiff mortar. From what I know of dry walls I am inclined to think the correspondent wrote "pointed" instead of "painted." If I am right he will have to dig into the joints an inch or so all around the inside of the wall with a light pick so that the plaster will key well into them. The wall should then be washed with a composition of one part hydrochloric acid and five parts of water. After the elapse of half an hour the acid should be washed off with clean water, then the surface should be gone over with a wire brush to remove the loose particles.

This treatment, however, cannot be followed if water is seeping through, as it must be done in dry weather. A wash of cement and water mixed to the consistency of cream applied before the oil-mixed mortar will aid the new mortar in sticking to the old work. The old wall must be thoroughly wet before the new mortar is applied.

The floor is treated in the same way. If it is now concreted the surface must be roughened with a stone hammer; if not concreted it must be done with oil-mixed concrete. The new mortar must be kept damp for the period of at least a week.

It will be well if the underlying soil is very wet to lay a 6-in. foundation of sand, cinders, broken stone or gravel, compacting these materials well by tamping. In addition, it will be advantageous to employ drain tiles in this porous foundation, leading them to a sewer if possible. On top of this should be placed a 4-in. layer of concrete in the proportions of one part Portland cement, two and one-half parts sand and five parts broken stone or gravel with 10 per cent. of petro-

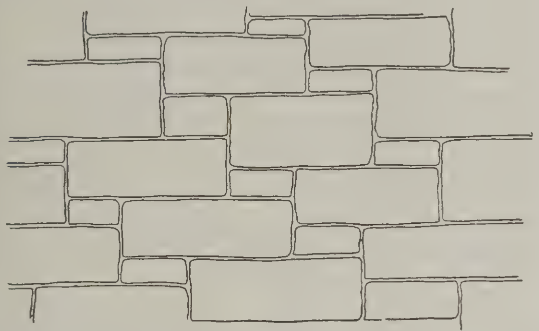


Fig. 7—Rubble—Beds Dressed Horizontal and Builds Vertical

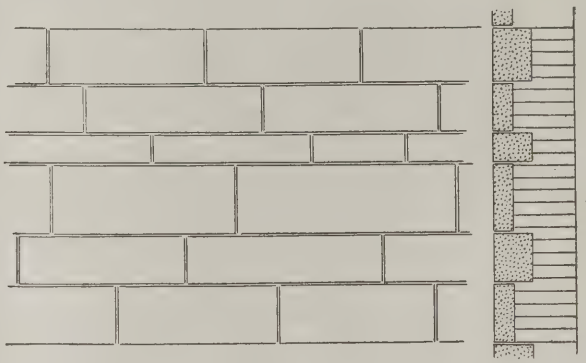


Fig. 10—Elevation and Section of Irregular Coursed Ashlar

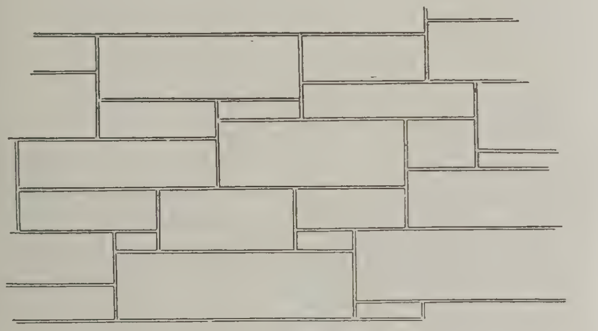


Fig. 8—A Good Example of Broken Ashlar

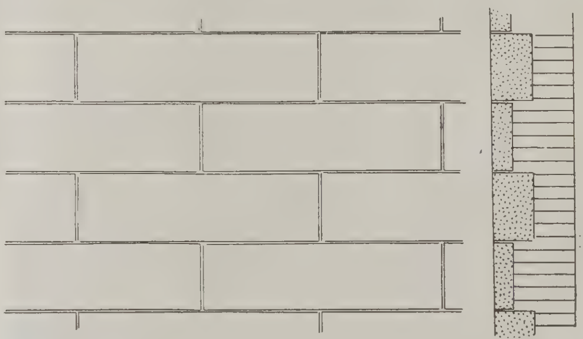


Fig. 11—Elevation and Section of Regular Coursed Ashlar (Plumb Bond)

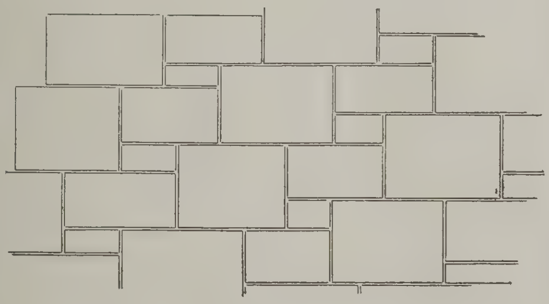


Fig. 9—Another Example of Broken Ashlar

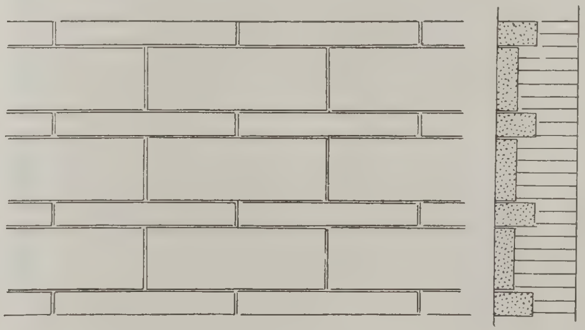


Fig. 12—Elevation and Section of Regular-Irregular Coursed Ashlar

Some of the Various Kinds of Masonry—By Charles W. Killam leum residuum oil. It may be noted that 10 per cent. will equal five quarts to the bag of cement. This treatment will make the cellar warmer and healthier in every way. Oil-mixed mortar containing 10 per cent. of oil is absolutely water tight under a pressure of 40 lb. per square inch. The oil should have a specific gravity of not less than 0.93 nor more than 0.94 at 25 degrees C. It should be soluble in carbon disulphide at air temperature to at least 99.9 per cent.

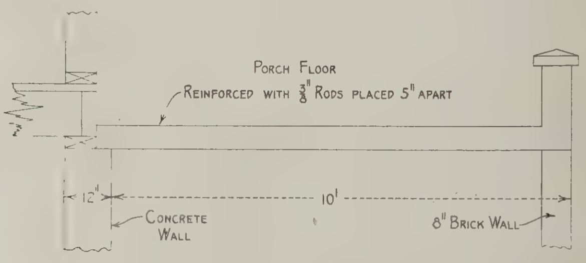
Four mortar vessels 8 in. in diameter, 2½ in. high and about ½ in. thick after hardening in moist air for one week were set in water 2 in. deep. A mortar mixture of one part cement to three parts sand was used. Vessel No. 1 contained no oil in the mixture. About one minute after immersion a damp spot showed on the bottom. After an hour the whole vessel was wet. In a few days the water in the vessel was level with the water outside. The remaining vessels, made of 1:3 mortar and mixed with 5 per cent., 10 per cent. and 20 per cent. of oil respectively, have remained perfectly dry on the inside during immersion for one year. Other tests in tanks and vaults are equally striking. The writer is at present experimenting with two different oils and if "H. L. M." is not in a hurry perhaps it will pay him to await the results, as no tests will have to be made on the oils used.

Laying Out Sash and Doors

From D. P. B., Redford, N. Y.—In connection with my comments on the inquiry of "O. P.," Belle Vernon, Pa., which appeared on page 52 of the July issue, the plumb rule mentioned should have been printed as 6 ft. long and not 6 in., as obviously a rule of the latter size would be entirely useless.

Building a Reinforced Concrete Porch Floor

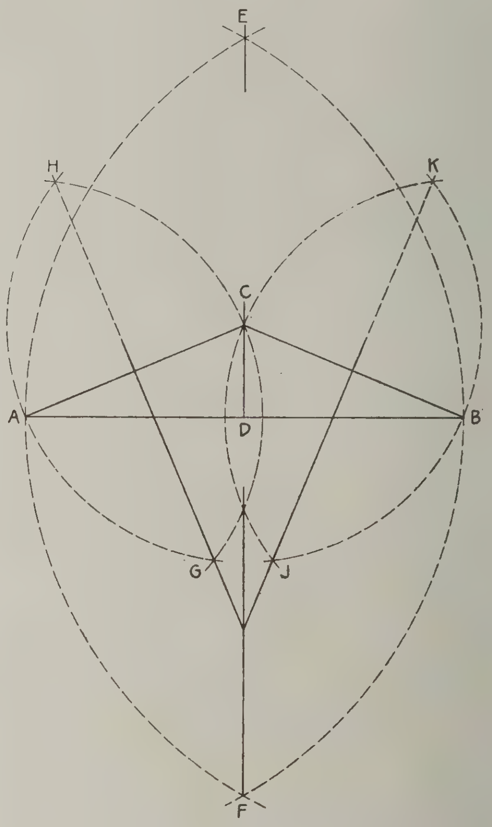
From J. H. V., Sioux Center, Iowa.—I am building a house with a porch and I want the floor to be of reinforced concrete. Noting the practical information which the readers furnish through the Correspondence Department, I would ask some of the experts how to go to work to accomplish my purpose. The floor is to be reinforced with ⅜-in. rods placed every 5 in. Must I lay a floor under the concrete or wire lath, or what is the method of procedure? The diagram represents a cross section of the porch showing the front foundation wall to be of brick 8 in. thick and the house wall of concrete 12 in. thick. Any information which those practically engaged in the trade may furnish will be greatly appreciated for it is possible that others besides myself may be interested in the problem which confronts me.



Building a Reinforced Concrete Porch Floor

Finding Radius of Circle

From W. H. P., Lowell, Mass.—In the April issue of the paper there is an article by "M. K." on finding the radius of arcs of circles and this is all right so far as it goes. If one were to swing arcs, as shown in the accompanying sketch, I believe the object sought would be more easily accomplished, not necessarily using any particular center or radius. Referring to the sketch, *A-B* is the span, *C-D* the rise and *A*, *C*, *B* are centers and intersections. There are also intersections at *E*, *F*, *G*, *H*, *J* and *K*.



Finding the Radius of a Circle

Making Window Frames Water Tight

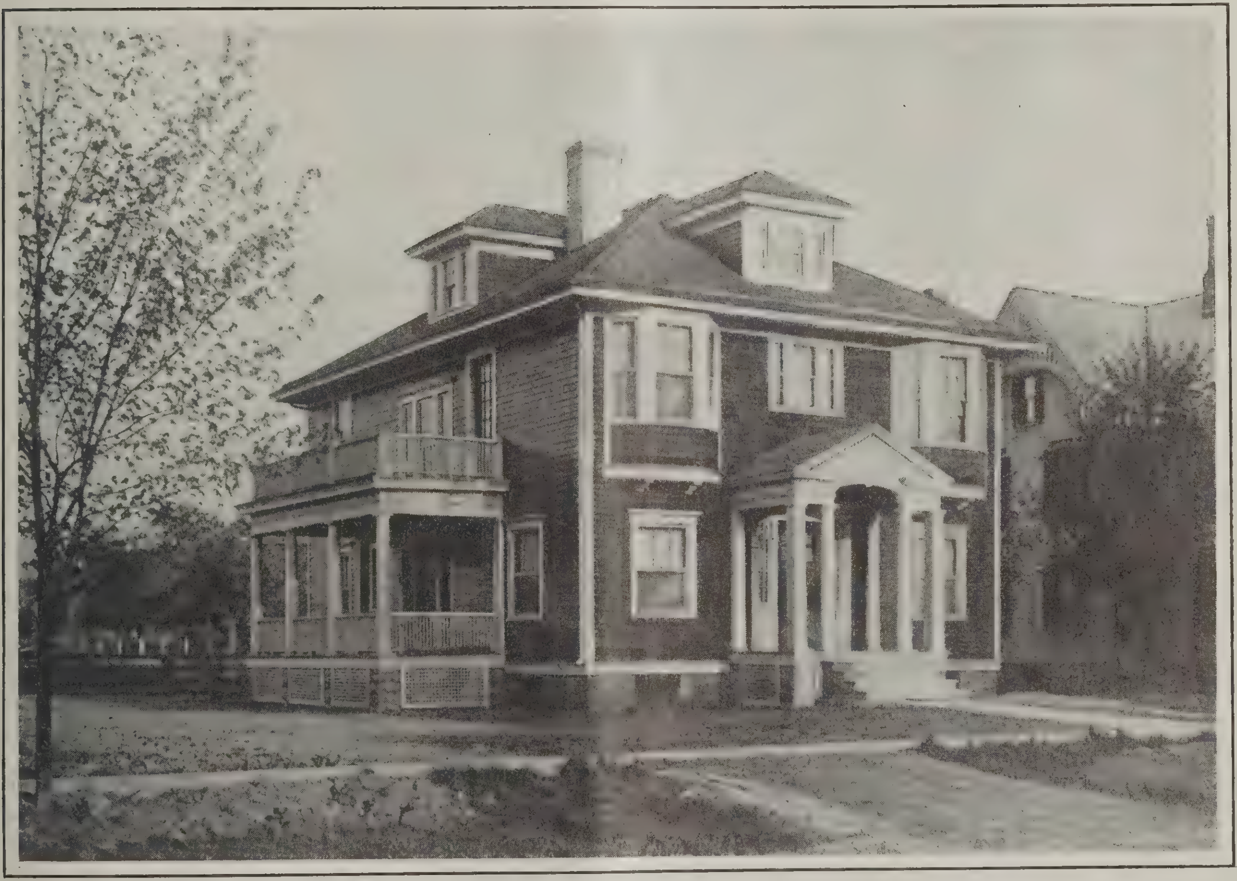
From W. H. C., Sanborn, N. Y.—I am in the building business and have a proposition which I desire to submit to the practical readers of the Correspondence Department. A great many of our window frames leak whenever there is a driving storm. Most of the trouble seems to be on both corners of the window aprons. Sometimes it shows dampness right along the apron. One job which I recall the owner said he caught 3 or 4 quarts of water that beat in around the window. I thoroughly examined the frames and found all joints tight; also the same with the clapboards, and if that amount of water beat in I certainly cannot understand where it came from.

If there is any way to overcome this difficulty I wish the readers would tell me what it is.

Frame Rectory for a Small Community

A Carefully Considered Arrangement in Which the Layout of the Rooms on the First Floor Is Noticeable

A RECTORY has many peculiarities of plan which makes this type of building a rather interesting study in itself. In the house here illustrated, the lot being shallow and provision for a small garage and a drive included in the layout, the building had to be placed very near the front line of the lot. A small porch served at the front entrance as a shelter as well as an architectural feature. A veranda of somewhat liberal dimensions was placed on the drive side which faces a public park. This provided more seclusion than would have been the case had the veranda been placed as usual across the front of the building.



A Frame Rectory for a Small Community—Architect John A. Sullivan, Buffalo, N. Y.

In plan, the house, which is 30 ft. wide by 40 feet deep, not including porches or veranda, the arrangement of rooms is such that visitors are taken into the small office at the right of the vestibule if their business is of a financial nature or into the reception room at the left if it is otherwise, without interfering with the rest of the household.

The servant in a rectory has to be continually ready to answer the front door bell, which many times is for sick calls at night, and therefore her room must be conveniently located both as regards the front entrance and the kitchen. The third floor is out of the question, so most pastors prefer having their servants on the ground floor, thus leaving the second floor completely to themselves. The pastor uses the first floor of his house comparatively little, except at meal time, spending most of the time in his study, which as here shown, is the large front room on the second floor. There must also be a sleeping room for him and one for the bishop when he pays an occasional visit; but other rooms are altogether optional.

A study of the plans here presented will show how the architect has met the requirements of the case in the present instance. According to his specifications the basement walls are constructed of rubble stone and are 18 in. thick up to a point 6 in. below grade. Above that to the sill, except under the porches, the walls are of blue quarry stone found in the immediate locality. The outside cellar stairs are concrete with a drain at the bottom.

The outside studs are 2 x 4 in., while the inside studs under bearing partitions and where the soil pipe come are 2 x 6 in. The bearing partitions are carried on 8 in. I-beams resting on 3 in. wrought iron pipe columns provided with cap and base.

The exterior of the house is clapboarded and painted a dark green, while the white pine trim including sash are painted an ivory white. The roof is covered with shingles and the exposed portions of the chimney are of white brick. The front porch roof and the dining room bay are covered with Taylor's IX tin, while the veranda is covered with 10 oz. duck fastened with copper tacks and laid in two coats of white lead and painted one coat on top. This affords a smooth floor for the second story balcony which is accessible through a glass door from the pastor's study. An awning can be attached to the cornice to shade the porch if so desired. The ceiling of the veranda is ⅝ in. matched ceiling and the front porch ceiling is plaster applied to wire lath. It has a lighting fixture in the center.

The exterior woodwork of the house is white pine with a weather lip over all windows. The floor joists are 2 x 10 in. and 2 x 12 in. all placed 16 in. on centers.

The inside finish of the kitchen pantry, rear hall and servants' rooms is of yellow pine, flat members with rounded corners. The balance of the house is finished in oak Mission stain. The doors are of the four panel variety.

There is a matched wainscoting in the kitchen, pantry and bathroom. The floors throughout the main part of the house are of oak laid on an underflooring of No. 2 hemlock placed diagonally. Deadening felt is used between the floors in the second story. Yellow pine flooring is used in the servant's part of the first floor and in the attic. In the servant's portion of the house the floor is covered with linoleum.

The fireplaces in the reception room and in the pastor's study are faced with Tapestry brick laid with a wide white joint and the hearths are laid with red quarry tile.

It will be observed from an inspection of the second floor plan that two windows are provided in each sleeping room for cross ventilation.

If a trifle different arrangement of the main floor was desired the office might be made a little larger by taking a foot or two off the dining room, then closing up the door from the vestibule into the reception room and placing this door to open into the stair hall, thus making the reception room into a parlor. The steps leading to the veranda could then be placed toward the front giving a more direct side entrance.

The house here shown is located at Angelica, N. Y., and was built within the last year at a cost of approximately $5,000, in accordance with plans prepared by Architect John A. Sullivan, 146 O'Connell Avenue, Buffalo, N. Y.

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Cooling Dwellings in the Tropics

Comfortable conditions in dwellings and other buildings in tropical countries have been made possible through the use of refrigerating machinery. Before the introduction of modern methods of cooling the air in buildings, dependence had to be placed upon the use of blinds upon which water could be sprinkled so as to cause a reduction of the temperature by evaporation and other similar means. Fans have also been used with a moderate degree of satisfaction but have not been entirely sufficient because of the fact that they simply move the air and do not cool it.

One method of cooling the air in buildings in Egypt utilizes a series of large galvanized iron pipes or coils surrounded with coke held in place by a metal grating with large meshes. Above the coils is a water tank which distributes the water over the coils and their coverings and is caught in a basin at the bottom and returned by a pump to the tank above. The loss by evaporation is made up periodically. Through the pipes thus cooled by the evaporation of the water, the air is passed into the building and occasionally a fan is used to increase the circulation through the material encasing the pipes, thus increasing the cooling effect. Other methods consist of compressing air and radiating the heat generated during the process, allowing it to expand before it is delivered to the building.

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Metal Lath As a Fire Retardant

A striking example of the fire retarding qualities of metal lath construction is found in connection with the destruction of a department store in Roxbury, Mass. The elevator shaft was located nearly in the center of the building and was subjected to the intense heat of the burning structure for many hours, as well as to the severe strain and shock of falling floors and masonry. In the construction of the elevator enclosure 4-in. angle irons properly braced and bolted were used at the corners, and to them were attached 1-in. furring channel irons placed 12 in. on centers. To this furring 24-gauge metal lath was laced and the whole plastered on both sides—excepting the top story which was finished on the inside only—making a solid partition or wall approximately 2 in. thick.

Pictures taken of the ruins some two months after the fire and after a period of severe winter weather with snow, cold and high winds, during which time the structural strength of the shaft and the material used in its construction were still further tested, show the elevator enclosure standing like a monument amid the surrounding wreckage.

It is stated that only in a few instances was the plaster broken away by the fire in such a manner as to expose the steel, and in no case was the bond of the plaster to the metal lath broken or the furring loosened from the supports. Where the plaster was broken away was on exposed corners or where the floor timbers were framed into supports and was due rather to blows from falling timber and masonry than to intense heat.

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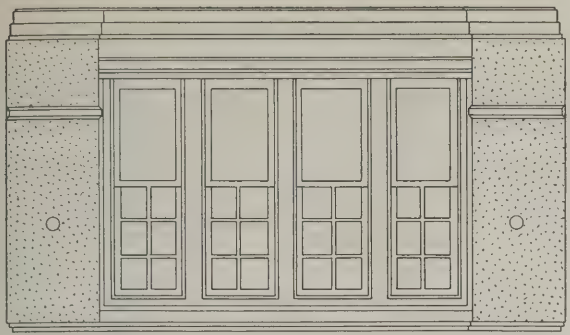
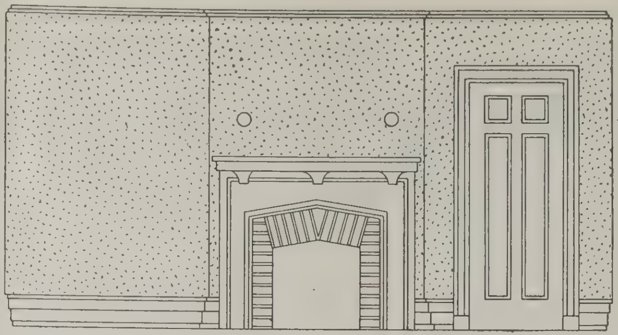
Salem's Exhibit of Structural Materials

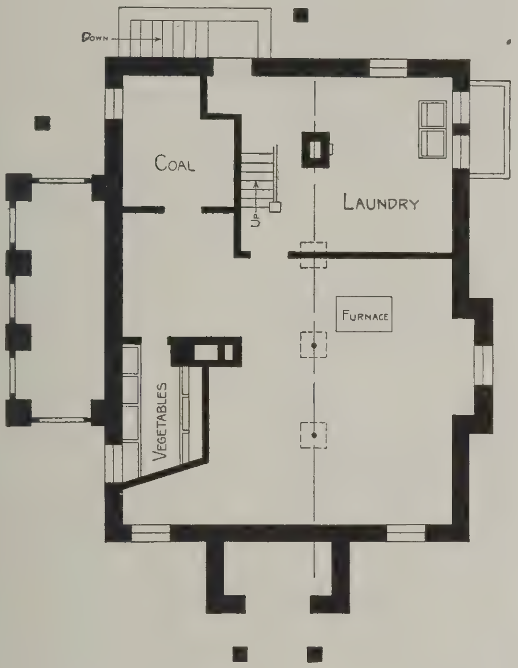
As a result of the disastrous fire which wiped out a large portion of the city of Salem, Mass., the Chamber of Commerce of that city will hold an exhibition of fireproof structural materials and methods in the State Armory, July 23 to August 8, inclusive. The exhibition is intended to familiarize the people with fireproof construction and encourage its use in rebuilding the city. The Chamber states that there are more than 60 factories to be rebuilt and homes for more than 2,500 families.



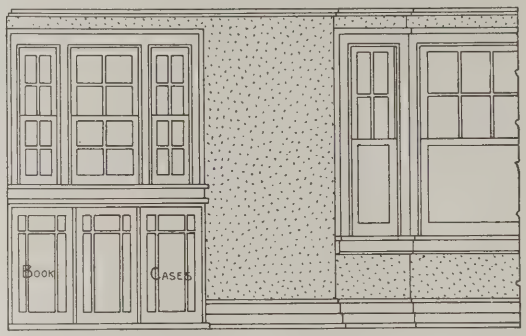
Bay Window Side of Dining Room—Scale 3/16 In. to the Foot



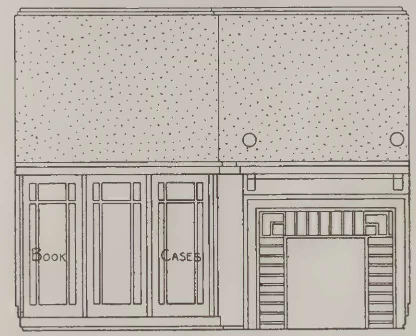
Elevation of Open Fire Place Side of Pastor's Study—Scale 3/16 In. to the Foot



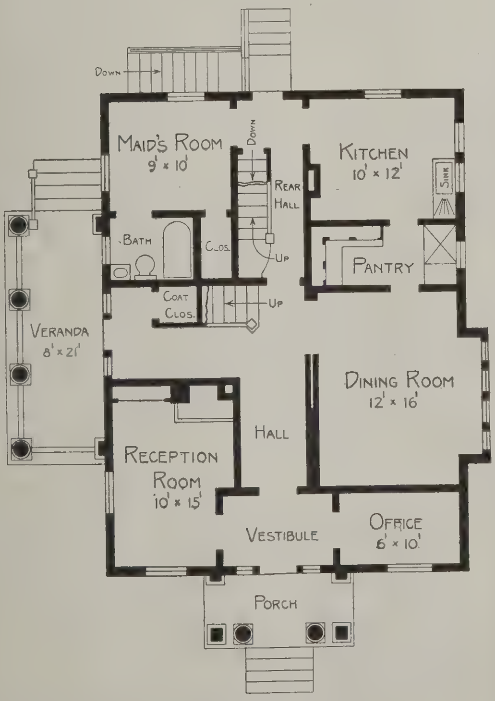
Foundation Plan—Scale 1/16 In. to the Foot



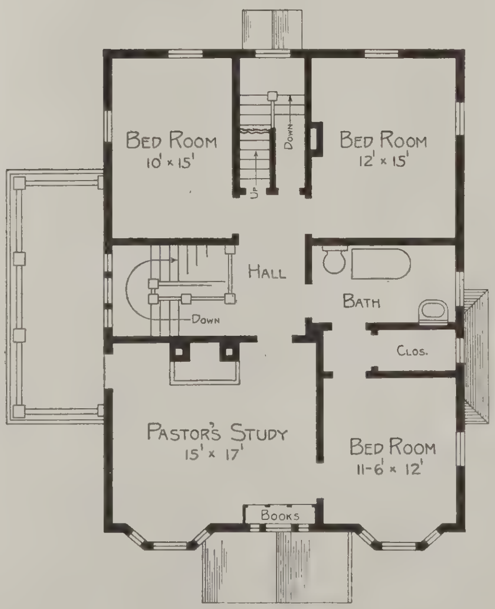
Elevation of Book Cases and Bay Window in Pastor's Study—Scale 3/16 In. to the Foot



Elevation in Reception Room Looking Toward Fireplace and Bookcases—Scale 3/16 In. to the Foot



Main Floor—Scale 1/16 In. to the Foot



Second Floor—Scale 1/16 In. to the Foot

A Frame Rectory for a Small Community—Plans and Miscellaneous Details

Panama-Pacific Exposition Buildings

The Construction Period Nearing a Close—The Eleven Principal Palaces Finished—Some Interesting Pictures

By Waldemar H. F. N. de Bille

THE recent completion of the eleven principal palaces of the Panama-Pacific International Exposition to all intents and purposes marks the close of the construction period of the exposition and the exhibitors are now busily engaged in the installation of their displays. Already a number of carloads of exhibits have arrived at the exposition and are being placed in their allotted spaces.

The Site

The site of the exposition consisting of 635 acres, extends for almost three miles along the shores of the Bay of San Francisco and for structural convenience was divided into three parts; the eastern end, sixty-five acres, is the concessions district or "zone;" the central division, in which are the exhibit palaces, and the western end, which is reserved for the state buildings, foreign pavilions, drill grounds, race track and stock yards.

The central division, which is now completed, includes about seventy-five acres. In the exact center of this space is a main group of eight buildings, the Palaces of Mines and Metallurgy, Varied Industry, Manufactures, Transportation, Liberal Arts, Agriculture, Education and Food Products.

The Group Effect

As all of these buildings are of uniform height and identical in placement of domes and minarets, and are joined together by arches which span huge courts, to the casual observer they present the appearance of being one great structure with one huge roof. The entire group forms a trapezoid 2756 feet in length, 1235 feet wide at the western end and 1250 feet wide at the eastern end.

A dome is the central factor of each building and is located at the intersection of the longitudinal and transverse aisles which are the principal features of the palaces. These aisles have arched trusses which terminate at the dome, and framing has been added under the dome to form false pendentives which appear to give support.

The walls and exteriors of the buildings forming the group were designed by one architect, while the structures proper were designed by the exposition's engineering staff. The courts between were designed each by a differing architect who was given a free hand in style.

An Unusual Feature

To architects and engineers connected with former expositions the proximity of the buildings to each other will appear to be the most unusual feature. As the construction was so temporary in character it was believed to be necessary to erect the buildings at considerable distance from one another to minimize the fire risk. They, however, made the amount of walking required of a visitor so great that in many instances it detracted from the pleasure of a tour of the exhibit buildings.

To eliminate the necessity of walking long distances and yet to prevent the danger of spreading fire, the engineers of the Panama-Pacific Exposition planned the central group with the courts between and prepared the palace walls facing on these courts with reinforced concrete. A number of special precautions against the spread of fire have also been taken, such as the installation of sprinkler systems in all of the buildings and the equipping of the turrets of the group with high-pressure swivelled nozzles.

The Palace of Machinery

The Palace of Machinery, the first of the buildings to be completed, is one of the largest wooden structures ever erected. It is 967 feet long, 167 feet wide, and 136 feet high. Its principal architectural features are the three main longitudinal naves with a secondary bay on either side and three transverse naves intersecting the longitudinal ones at the center. All of the great trusses and arches of the building are constructed entirely of wood and were built upon the ground and afterward hoisted into position.

At the western end of the main group is the Palace of Fine Arts. As this building is to house valuable paintings and pieces of statuary, it was considered necessary to make it fireproof. In plan it is shaped like the arc of a circle, and is 950 feet long and 135 feet wide. The dome of the rotunda is 162 feet in height.

The construction consists of a steel frame supporting the roof of skylights and thin concrete slabs. The walls are of cement plaster approximately two and one-half inches thick. The exterior is coated with the imitation Travertine marble used on all the exteriors of the exposition.

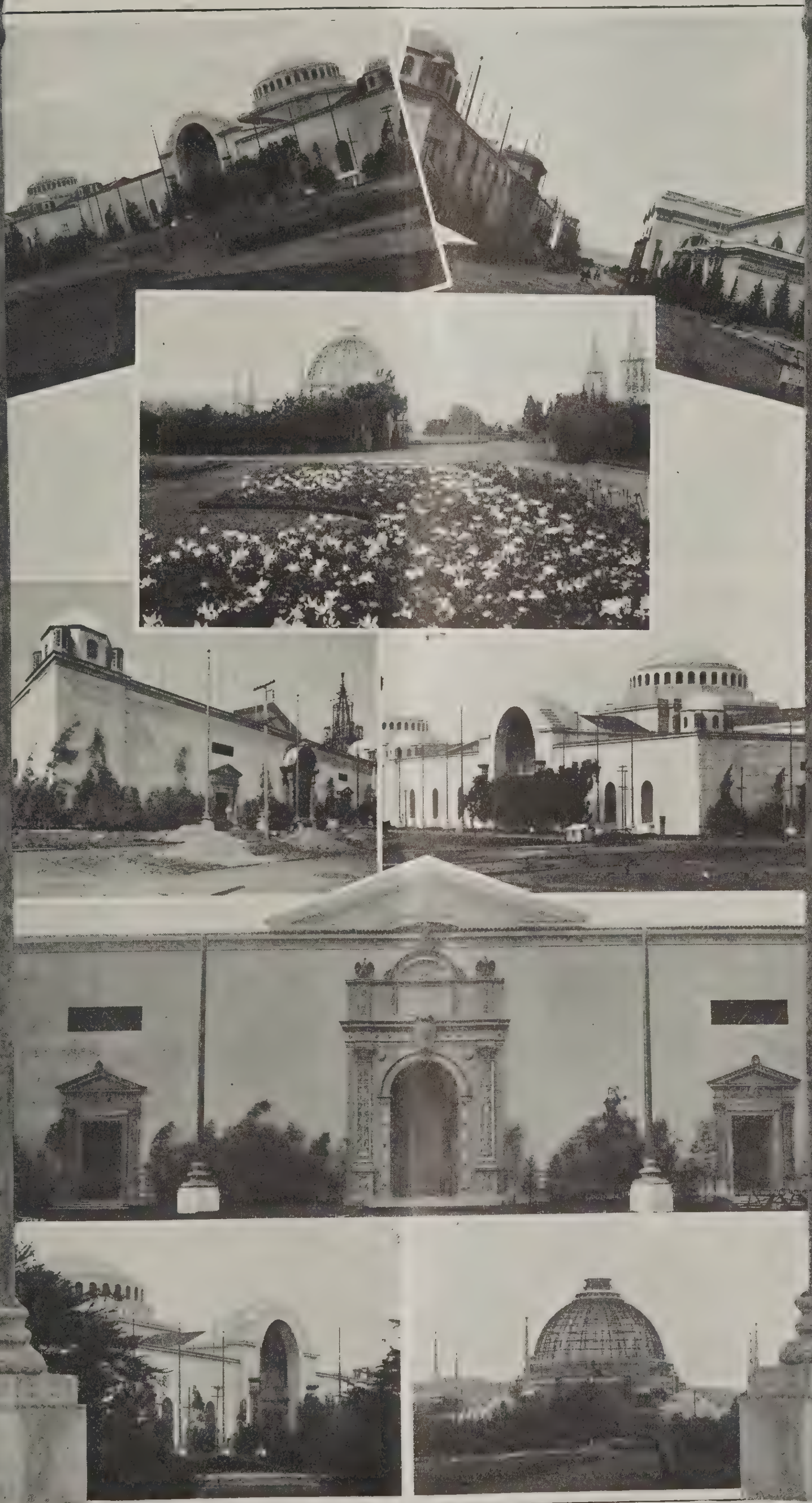
Palace of Horticulture

The Palace of Horticulture is Saracenic in composition and in relation to its domes and minarets is similar to the Mosque of Sultan Ahmed I. The building is 600 feet long, 185½ feet high to the top of the dome, and 300 feet wide. The dome is 152 feet in diameter. This is entirely covered over with glass and will be illuminated at night by a unique plan from the interior.

The Page of Pictures

Referring to the group of pictures on the facing page there is shown in the upper left hand corner

Panama - Pacific Exposition Buildings



Copyright, 1914, by Panama-Pacific International Exposition Co.

the Palace of Food Products at the extreme left and Palace of Education at the right, showing the half domes known as the Domes of Vigor and Philosophy respectively, these constituting the main western entrances to the Palaces. The half domes are each 113 ft. in hight. In the upper right hand corner is a charming view of San Francisco Harbor glimpsed between the Palace of Varied Industry on the left and the Palace of Machinery on the right.

Just below these two pictures is a view of the south gardens and the Palace of Horticlture as it appeared while in process of construction.

In the center at the left is the south façade of the Palace of Education, the three portals shown being adopted from the Italian Renaissance. In the center at the right is the Palace of Education showing upon its left the Dome of Philosophy, which is its main western entrance. The center dome is 160 ft. high.

Directly below these two pictures is shown the south entrance to the Palace of Food Products opening on the approach to the Court of Four Seasons.

In the lower left hand corner is the dome of Philosophy, the main western entrance of the Palace of Education as seen from the lagoon before the Palace of Fine Arts. This dome is also 113 ft. in hight and its interior vault is richly decorated with mosaics. The yarge central dome of the Palace is 150 ft. in diameter and 160 ft. in hight.

In the lower right hand corner is a view looking west toward the Palace of Horticulture in the Great South Gardens. The huge dome in the center of the picture is 186 ft. high and 152 ft. in diameter. The dome is covered with wired glass and at night will be illuminated from within by colored search lights. Its great size will permit the exhibition of the largest palms.

In this connection it may be interesting to present a few statistical facts about the exhibit palaces of the Exposition.

	Cost	Area, Sq. Ft.	Floor, Sq. Ft.	Hight, Ft.
Palace of Education	$304,263	205,100	394x526	160
" " Food Products	342,551	236,690	424x579	160
" " Agriculture	425,610	328,633	579x639	160
" " Liberal Arts	344,180	251,300	475x585	160
" " Manufactures	341,069	234,000	475x552	160
Varied Industries	312,691	219,000	414x541	160
Mines and Metallurgy	359,445	252,000	451x579	160
Transportation	481,677	314,000	579x614	160
Machinery	341,069	369,000	367x967	136
Horticulture	341,000	195,000	....	....
Fine Arts	580,000	204,325	950x135	162½

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The American Institute of Architects, with headquarters in Washington, D. C., has through its Board of Directors offered to the President of the United States its active co-operation for the betterment of housing conditions among those of limited means in the cities of the United States. The Institute has also offered its aid and influence in all matters connected with the physical and artistic development of the city of Washington.

A Brick Church at Wellsburg, Iowa

The Banquet Room in the Basement a Distinctive Feature —Various Details of Construction—The Materials Used

In connection with a great majority of church organizations, especially in the smaller places of the country, provision is often made in the church edifice for various social features, such as festivals, entertainments, church suppers, etc. As a general thing a dining or banquet room serves the purpose, this being usually located in the basement where a kitchen can most conveniently be installed. In the case of the church building which we illustrate herewith the banquet room occupies the major portion of the basement, the kitchen being placed directly in the rear and adjoining the furnace room. Reference to the floor plans will show the division of the basement space, also the arrangement of the auditorium floor. Here a class room 26 x 30½ ft. is placed between the two vestibules at the front of the building and directly overhead is another class room of the same size. The auditorium itself measures 40 x 47 ft. and has the floor inclined toward the rostrum.

The building is that of the Reformed Church at Wellsburg, Iowa, and the plans were prepared by Architect Edgar A. Payne of Carthage, Ill.

According to the specifications the foundation footings and the outside walls to grade are of poured concrete composed of a 1:2½:4 mixture of best Portland cement, clean sharp sand and crushed limestone. The basement floor throughout is of concrete 4 in. thick of the same mixture as that mentioned and finished with a top coat 1 in. thick composed of one part cement to two parts sand. The floor is carefully graded to the drain outlets, there being sufficient fall to drain readily. The outside steps at the three entrances—two front and one at the side for the pastor—also the steps at the basement entrances are of concrete finished with a 1-in. top coating the same as the basement floor.

The backing of all exterior walls and the interior basement walls is of hollow clay blocks 5 x 8 x 12 in., laid flatwise and brick bonded to the facing brick. All brickwork, it may be mentioned, is laid with Carney's cement.

The exterior basement walls from the base course to the water table are faced with No. 1 paving brick, while all exterior walls above the water table, the chimney tops, etc., are faced with pressed brick, medium red in color. All arches are bonded arches with the brick ground to radius.

All cut stone trimmings as well as water table, etc., are of dressed Bedford stone. The recessed doors at the entrances have cast-iron plates.

All walls and ceilings are covered with cement plaster and the surfaces frescoed in artistic designs.

All timbers are of seasoned fir free from defects damaging their appearance or durability. The roof trusses are secured to the walls by means of wrought-iron strips attached to anchor rods extending down into the brick walls for a distance of 4 ft. The open timber truss work over the audience room is cased and finished in neat design.

The main roof is sheathed with surfaced lumber and laid diagonally on the roof joists. The entire area is covered with Oregon red cedar shingles laid 4½ in. to the weather.

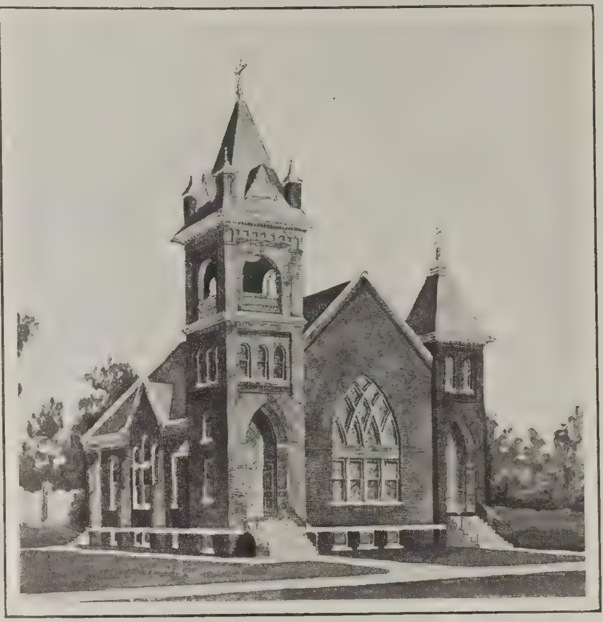
The coping of the gable walls, the eave cornice, finials of the towers, ridge rolls and the lining of the valleys are of galvanized iron. The gutters are lined with tin and the bell deck is covered with the same material.

The floors are double throughout, the under floor being of shiplap sheathing and the finish floor of ½ x 1½ in. face rock maple.

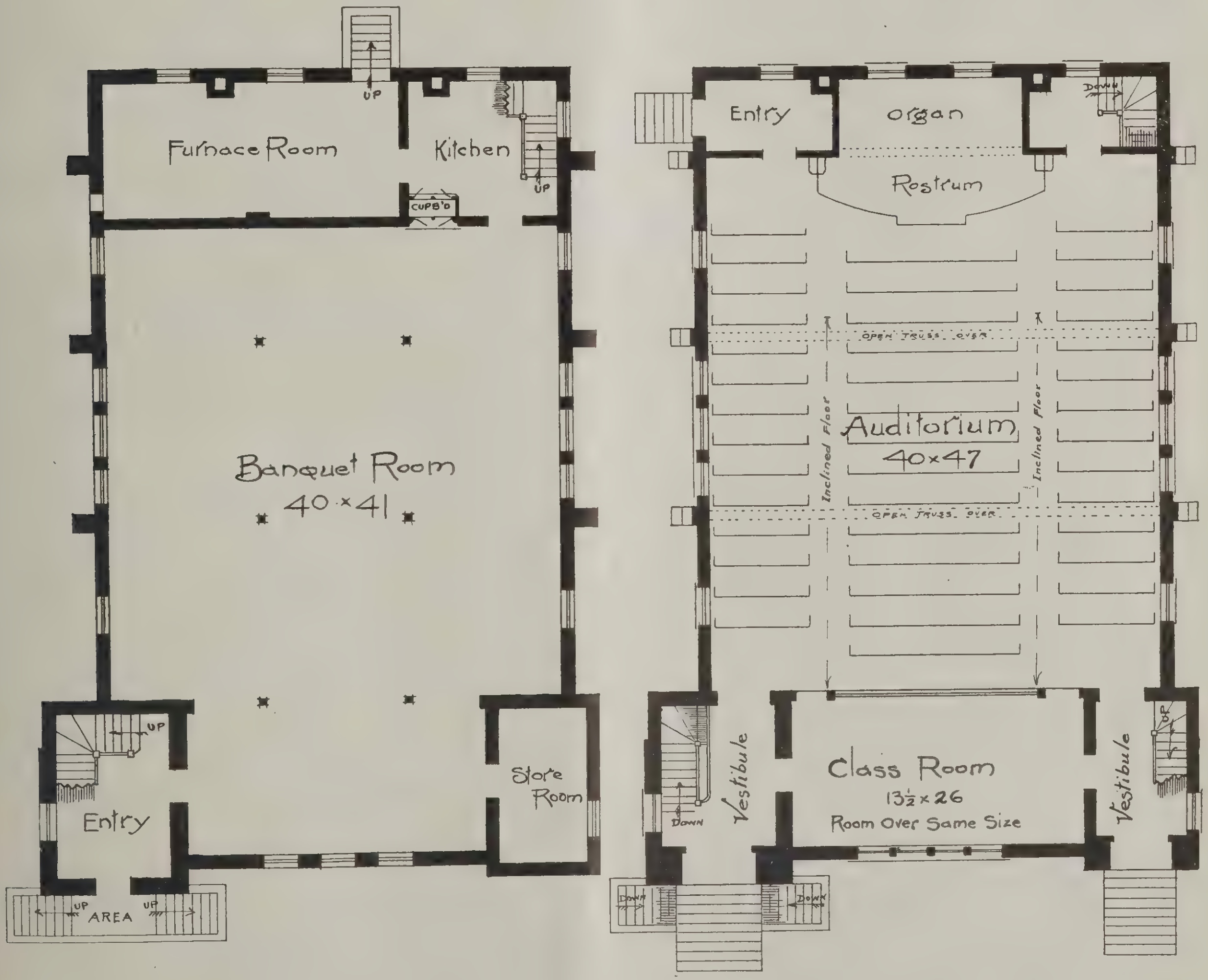
The interior trim is of natural Georgia pine. The doors are paneled.

Wilson's rolling partitions are provided between auditorium and classrooms. The windows and transoms are glazed with art leaded stained glass of neat design. The hardware is of old copper with bronze finish.

The architect states that the church was erected last year at a total cost of $11,900, including all construction work, interior and exterior finish, cement floor in basement, furnace heat, etc. He suggests that the design may possibly be of interest to the correspondent "O. S. W." of Robinson, Kan., who asked some time ago through the columns of the paper for plans of a modern brick church to cost in the neighborhood of $10,000.



General View of the Completed Building



Basement, Showing Banquet Room, Kitchen, etc.

Plan of Auditorium Floor

A Brick Church at Wellsburg, Iowa—Edgar A. Payne, Architect, Carthage, Ill.

A Review of Business Conditions

The Chamber of Commerce of the United States Reports a Growing Feeling of Optimism

SO much is being printed in the daily and trade press regarding business conditions and the growing feeling of optimism which is manifest in many quarters that the conclusions of the Chamber of Commerce of the United States based upon data gathered from all parts of the country, must be regarded as highly significant. In a review of the agricultural and business conditions sent to its members on July 20 the Chamber emphasized the bright prospects for bumper crops this year and reported a general feeling of optimism over what the future has in store in spite of present depression in manufacturing, mining, lumber and railroad centers.

Where Optimism Prevails

"It is rather remarkable," said the review, "that in most sections, even in manufacturing sections, where business conditions are at their worst, there is much optimism of the immediate future, and a general feeling that, with normal crops, there will be very great improvement in all business matters during the remainder of this year.

"Manufacturing is exceedingly quiet throughout the country. Mining, nearly all kinds, suffers from strikes and lack of demand. Lumber interests are feeling the dearth of building, especially in small towns and in the country. The railroads, because of decreasing revenues and increasing expenses, have cut down their forces as far as possible, and laid off many trains, in the interest of economy. These conditions have naturally bred much apprehension, conservatism and pessimism in districts where these industries are the principal sources of revenue to the inhabitants. This is particularly true in the Middle and New England States, and in some of the large manufacturing centers of the West and South.

"Against these unfavorable conditions, the situation of agriculture is most encouraging, despite drought conditions that have prevailed more or less extensively in the spring and summer in widespread sections. Widely extended rains in the latter part of June and early in July have put a new phase upon affairs."

The Iron and Steel Industry

In addition to the above we would call attention to the improved sentiment prevailing in the iron and steel industry and to the fact that within the last few days an advance in prices of certain products has been announced. This industry is usually regarded as a barometer of general business conditions and its tendency as the forerunner of what may be expected in other directions. The Secretary of the Treasury has announced a program on the part of the Financial Department of the Government which will insure the placing of funds where they are needed and prevent any financial stringency as the result of the moving of the bounteous crops which are now expected. He points out that the financial condition of the country is exceptionally sound and that the outlook from his point of view is most encouraging.

◆

A New Store and Loft Building

The new 16-story store and loft building which has just been commenced immediately adjoining the Park Avenue Hotel on East Thirty-third Street, New York City, covers an area about 85 x 100 ft. and will cost in the neighborhood of $450,000. It will be constructed of brick with hollow tile partitions and will have a front of white glazed terra cotta. The plans have been drawn by M. E. Rountree, architect, of 3 East Forty-fourth Street. According to these the general design and layout of the building is such as to permit of its being used for light manufacturing or office purposes and is so arranged that any tenant may have any desired amount of floor space.

◆

A New York Mansion

Early in July the plans were filed for the new private residence which is to be erected for Otto H. Kahn at Ninety-first Street and Fifth Avenue, New York City, in accordance with drawings prepared by Architect C. P. H. Gilbert, Twenty-fifth Street and Broadway. The building will be four and a half stories high, will be constructed of stone imported from France and the exterior designed in severe classic style. According to present estimates the house will cost something like $1,000,000. The house will occupy a site fronting about 101 ft. on Fifth Avenue and 145 ft. on Ninety-first Street, but open spaces are to be left on all sides.

◆

Standardization of Trade Catalogues

More or less discussion has occurred in the past and no little attention is being given at the present time to the standardization of trade catalogues. Along this line the Chapter of the American Institute of Architects at Seattle, Wash., appointed a committee at its May meeting to devise a form of notification to manufacturers who send out trade catalogues that do not conform to standard sizes, "that such catalogues are consigned to the waste basket." It was further ordered that the secretary be instructed to notify the parent body of the action taken with the request that it be urged on all other chapters to take similar action.

New Publications

Jobbing Work for the Carpenter.—By Edward H. Crussell; 274 pages. Size, 6¼ x 9 in. Illustrated with 270 line cuts and half tones. Bound in board covers with illuminated side title. Published by the David Williams Company, 231 to 241 West 39th Street, New York City. Price, $1.50.

This work has been prepared by a man of wide and varied practical experience to meet the demands of the carpenter and the builder who are frequently called upon to execute odd jobs in the way of repairs or alterations. It is a sad commentary on the trade literature of the present day that no adequate description can be found in any of the books on carpentry telling the best way in which to perform these odd jobs and how to do the work with a minimum of labor and expense. For example, the cutting of a doorway or other opening through a partition wall of lath and plaster and without breaking away around the edges any more of the surface than can be covered by a 4-in. casing or architrave is something that the practical man desires to know all about, for the way in which it is usually done is to break away so much of the old material that it is necessary for the owner to call in a plasterer to patch up around the casing and make the job presentable. The refitting of old doors is another job the carpenter and the builder is often asked to do and in the book under review there is a long list of repair and alteration jobs that makes the volume of special interest and value to every one in the trade. Some idea of its scope may be gathered from the various chapter headings, a few of which, in addition to those mentioned, are Tools and Workshop Equipment; Making a Cash Till; Store Counters; a Small Bookcase; Making a Four-paneled Door; Constructing Window Frames; Making a Show Case; Building a Roll Top Desk, and Making a Drawing Board. Attention is also given to curved work, contractors ladders, design and construction of fences and numerous shop kinks.

A portion of the matter contained within the covers of the book originally appeared as a serial article in the columns of *The Building Age*, but important additions have been made, chapters have been rearranged, the original matter thoroughly revised and new illustrations have been prepared, so that with the very complete and comprehensive index which is furnished the book is one which no practical carpenter or builder can afford to omit from his library of trade literature.

Foundations of Bridges and Buildings.—By Henry S. Jacoby and Roland P. Davis. Size, 6¼ x 9¼ in.; 603 pages. Nearly 200 illustrations. Bound in cloth. Published by McGraw-Hill Book Company. Price, $5 net.

While this work is intended more perhaps for the engineer than for the builder interested in moderate cost construction, there are parts of it which will undoubtedly appeal to him by reason of the information which he will find of suggestive value. The aim of the authors has been to treat in a systematic manner the entire subject of foundations for buildings and bridges as represented by American engineering practice, but a large proportion of the space is given up to piles and pile driving, since, as the authors point out, "young engineers are more likely to obtain their early experience with pile foundations than with any other class of foundation construction." The subject matter is comprised in 19 chapters and some idea of the scope of that in which builders are likely to be especially interested may be gathered from the classifications under which the subjects are treated. These embrace timber piles, their driving and bearing power; concrete piles; metal and sheet piles; cofferdams; box and open caissons; pneumatic caissons for buildings; pier foundations in open wells; spread foundations; underpinning buildings, and pneumatic caisson practice. Some of the other chapters discuss bridge abutments; ordinary bridge piers and make reference to engineering literature.

Modern Methods of Waterproofing.—By Myron H. Lewis; 36 pages. Size, 6 x 9 in. Illustrated. Bound in paper covers. Published by the Norman W. Henley Publishing Company. Price, 50 cents.

The waterproofing of concrete and other structures is such a vital factor at the present time that the information contained within the covers of this little work cannot fail to prove interesting to all having to do with building construction. In fact, the matter consists of a condensed statement of the principles, rules and precautions to be observed in waterproofing and damp-proofing structures and structural materials. It is a reprint of Chapter XXX of the author's new book "Popular Handbook for Cement and Concrete Users" and the material for this chapter has been condensed and arranged from the author's papers read before various engineering societies and from his contributions on the subject of waterproofing to numerous trade publications devoted to waterproofing and concrete work.

The methods of waterproofing illustrated and described embrace the "Membrane" or "Elastic," the "Integral" or rigid, and Surface Coating. These methods are defined in detail and sectional illustrations are given showing just how the work is done.

The concluding pages are given up to a statement of the composition of some of the waterproofing compounds in use.

The History of the Dwelling House and Its Future.—By Robert Ellis Thompson. Size, 5½ x 7½ in.; 172 pages. Bound in board ocvers with illuminated title. Published by J. B. Lippincott Company. Price, $1.

This little work traces in rather unique style the development of the house from its beginning to the present day and in his preface the author cautions his readers against "a too literal construction" of his statements. It is not meant that the course of development he has traced is that which was followed with mechanical regularity in every case. Houses are the work of men and not mere mechanical forces he points out. Being men they sought to adjust their domestic surroundings to their own tastes and preferences. In doing so they also gave great scope to social tradition. Partly to avoid the trouble involved in getting anything done out of the common and partly to avoid social criticism they are usually built after the pattern of their neighbors. In many cases, however, they showed independence of taste and judgment in the construction, arrangement and adornment of their houses. The author states that no row of houses in an old medieval town would exhibit such a wearisome uniformity as is to be found even in the wealthier parts of modern cities. Both the house owner, for whom the work was done, and the workmen engaged in its erection showed far more independence and design than is to be found in modern men of either class. What the author has aimed at is the selection of what is typical and normal out of a boundless variety of facts.

The Garden City.—By C. B. Purdom; 330 pages. Size, $6\frac{3}{4}$ x 9 in., with four colored pictures by T. Friedenson and 140 other illustrations. Bound in board covers. Published by E. P. Dutton & Co. Price, $3.50 net.

The subject matter of this work is an account of the Garden City of Letchworth, England, and a restatement of the original ideas that brought it into being. The author points out that it was designed with the object of showing that the development of the towns of England need not be left to chance or to the mercy of speculators, and with the further object of making town life tolerable to people who have come to hate it—not merely as William Morris hated it because of its ugliness and grime, but because it is a menace to the vitality of the race. The author has endeavored to set down something of the romance that belongs to what may be regarded as an adventurous endeavor to create a new thing in English life and has tried to interpret the town to those who know it merely by name. He says that Garden City is not to be confused with the new suburbs or town-planning schemes or even with the familiar model village. It is something quite different from them all.

Features which will prove specially interesting to American readers are the typical examples of Garden City houses and the great variety of workingmen's cottages. Here not only is a description presented, but weekly rentals are tabulated showing average return on capital cost.

◆

A Garage of Novel Construction

The immense garage now under way in East 72d Street will be the pioneer of its type in America and has been so designed by the architect that the automobiles will mount from floor to floor by means of ramps or inclines instead of elevators. In fact the latter will be entirely eliminated with the exception of one elevator for the purpose of carrying disabled cars, and the ramps have been so designed that it will be possible for two machines to pass at any point with the utmost safety.

The building will be four stories high on 72d street and five stories on 71st street. It will cover an area of 25,500 sq. ft. and will cost $250,000. It has been designed by Architect William H. Gompert, 171 Madison avenue, New York City, in the French Renaissance style of architecture. The architect and the president of the Automobile Club of America, for which the garage is being erected, have spent much time and research in experimenting in order that the building and its equipment will meet every requirement from the standpoint of utility. It will be equipped in all parts with a sprinkler system and every other precaution has been taken to eliminate the fire hazard.

A compressed air apparatus will be installed with outlets in various parts of the building so that automobile tires may be inflated without moving the machine from its assigned position. There will also be a vacuum cleaning system installed with various outlets so that the machines can be readily cleaned. There will be electrical outlets at convenient points to enable a mechanician to adjust or repair a car at its assigned place.

◆

Time to Build Homes

In discussing the prices of building materials and the cost of labor, a writer in a recent issue of the *Manufacturing Record* points out that as architects and contractors have more time just now to plan and carry out contracts than in periods of activity the present is the time to build. The man who wants a home and has money with which to build it can do it now to better advantage than when prosperity comes and at a much lower cost and with more care and attention on the part of contractors and mechanics.

"Thousands and tens of thousands of men in this country are intending to build homes for themselves, but are waiting for what they think will be a more propitious moment, when everybody is an optimist rather than a pessimist. When they do undertake to build, every item will cost them more, and they will find great difficulty in securing as much attention in construction work and in the equipment of their homes as could be had now.

"This is preëminently the time when every man who expects to build a home, a store, or an office building, if he has the money, should do it. This is the time when every manufacturing enterprise which knows that it needs new machinery or the enlargement of its plant, and has the money available, should do the work now. This is the time when our municipalities should press as vigorously as possible all of their improvements, in order to get the benefit of the lower prices of materials now prevailing as compared with boom periods. Almost over night a change in business could be brought about, if people who are able to do this building and construction work would undertake it now."

◆

A wrecking company paid the city of New York $8,600 for the privilege of wrecking the Grand Union Hotel, facing the Grand Central Terminal on Forty-second Street, which had to be removed to make room for new subways. The contract called for the completion of the work within 48 days.

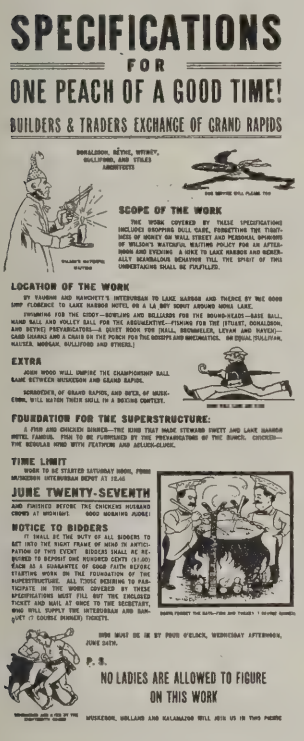
Current News of Builders' Exchanges

Annual "Outings" a Feature—Organization of New Exchanges—Membership Campaign—A Barge Cruise

Outing of Grand Rapids Builders Exchange

THE annual outing of the Builders and Traders' Exchange of Grand Rapids, Mich., in conjunction with the Exchanges at Muskegon, Holland and Kalamazoo, was held on June 27 at Lake Harbor, a beautiful summer resort on Mona Lake and Lake Michigan, and was notable in many respects. As the resort season had not opened the members and guests had the hotel grounds and beach all to themselves. Out of a membership of 184 the Grand Rapids Exchange mustered 166 men and there were about 50 from other towns who were guests on that occasion.

Some time before the time set for the outing the committee of arrangements issued an announcement entitled "Specifications for One Peach of a Good Time" and embellished with various sketches of a humorous nature. A reduced facsimile of this appears herewith. Under the head "Scope of the Work" the Specifications read "The work covered by these Specifications includes dropping dull care, forgetting the tightness of money on Wall Street and personal opinions of Wilson's watchful waiting policy, for an afternoon and evening; a hike to Lake Harbor and generally scandalous behavior until the spirit of this undertaking shall be fulfilled."



SPECIFICATIONS
FOR
ONE PEACH OF A GOOD TIME!
BUILDERS & TRADERS EXCHANGE OF GRAND RAPIDS

DONALDSON, BEYNE, WITNEY, GULLIFORD, AND STILES
ARCHITECTS

SCOPE OF THE WORK

THE WORK COVERED BY THESE SPECIFICATIONS INCLUDES DROPPING DULL CARE, FORGETTING THE TIGHTNESS OF MONEY ON WALL STREET AND PERSONAL OPINIONS OF WILSON'S WATCHFUL WAITING POLICY FOR AN AFTERNOON AND EVENING A HIKE TO LAKE HARBOR AND GENERALLY SCANDALOUS BEHAVIOR TILL THE SPIRIT OF THIS UNDERTAKING SHALL BE FULFILLED.

LOCATION OF THE WORK

BY VAUGHN AND HANCHETT'S INTERURBAN TO LAKE HARBOR AND THENCE BY THE GOOD SHIP FLORENCE TO LAKE HARBOR HOTEL OR A LA BOY SCOUT AROUND MONA LAKE.

SWIMMING FOR THE GIDDY—BOWLING AND BILLIARDS FOR THE ROUND-HEADS—BASE BALL, HAND BALL AND VOLLEY BALL FOR THE ARGUMENTIVE—FISHING FOR THE (STUART, DONALDSON, AND BEYNE) PREVARICATORS—A QUIET NOOK FOR (HALL, BROMMELER, LEVAN AND HAVEN)—CARD SHARKS AND A CHAIR ON THE PORCH FOR THE GOSSIPS AND RHEUMATICS. OR EQUAL (SULLIVAN, HAUSER, MORGAN, GULLIFORD AND OTHERS.)

EXTRA

JOHN WOOD WILL UMPIRE THE CHAMPIONSHIP BALL GAME BETWEEN MUSKEGON AND GRAND RAPIDS.

SCHROEDER, OF GRAND RAPIDS, AND DYER, OF MUSKEGON, WILL MATCH THEIR SKILL IN A BOXING CONTEST.

FOUNDATION FOR THE SUPERSTRUCTURE:

A FISH AND CHICKEN DINNER—THE KIND THAT MADE STEWARD SWETT AND LAKE HARBOR HOTEL FAMOUS. FISH TO BE FURNISHED BY THE PREVARICATORS OF THE BUNCH. CHICKEN—THE REGULAR KIND WITH FEATHERS AND ACLUCK-CLUCK.

TIME LIMIT

WORK TO BE STARTED SATURDAY NOON, FROM MUSKEGON INTERURBAN DEPOT AT 12.45

JUNE TWENTY-SEVENTH

AND FINISHED BEFORE THE CHICKENS HUSBAND CROWS AT MIDNIGHT. GOOD MORNING JUDGE!

NOTICE TO BIDDERS

IT SHALL BE THE DUTY OF ALL BIDDERS TO GET INTO THE RIGHT FRAME OF MIND IN ANTICIPATION OF THIS EVENT BIDDERS SHALL BE REQUIRED TO DEPOSIT ONE HUNDRED CENTS ($1.00) EACH AS A GUARANTEE OF GOOD FAITH BEFORE STARTING WORK ON THE FOUNDATION OF THE SUPERSTRUCTURE. ALL THOSE DESIRING TO PARTICIPATE IN THE WORK COVERED BY THESE SPECIFICATIONS MUST FILL OUT THE ENCLOSED TICKET AND MAIL AT ONCE TO THE SECRETARY, WHO WILL SUPPLY THE INTERURBAN AND BANQUET (7 COURSE DINNER) TICKETS.

BIDS MUST BE IN BY FOUR O'CLOCK, WEDNESDAY AFTERNOON, JUNE 24TH.

P. S.

NO LADIES ARE ALLOWED TO FIGURE ON THIS WORK

MUSKEGON, HOLLAND AND KALAMAZOO WILL JOIN US IN THIS PICNIC

Fac-simile of Announcement

The features of the day included a game of baseball between nines made up from members of the Grand Rapids and Muskegon Exchanges. John Wood acted as umpire and the result was a score of 7 to 5 in favor of Muskegon.

The dinner was a regular banquet, of seven courses, of fish and young turkey with all the trimmings.

There were talks by Francis D. Campau, advising counsel for the Exchange, his topic being "The Legal Phase of the Building Industry"; by George A. Murphy, who referred to the wonderful increase in real co-operation during the past few years in connection with the members of the Builders and Traders' Exchange; by F. E. Stiles, who also talked upon cooperation and who handled the subject in an impressive manner; by George C. Schroeder, president of the Grand Rapids Exchange, and also treasurer of the National Association of Builders' Exchanges, who spoke on the work of the organization and what it was doing in Grand Rapids, and by Mr. Wiselogel, president of the Michigan State Association of Builders' Exchanges, who entered an earnest plea for the continued growth of the organization in helpfulness to all with whom it comes in contact; C. A. Donaldson, president of the National Ornamental Glass Manufacturers' Association of the United States and Canada, also spoke.

After the good things provided had been duly con-

A Group of 148 of the Members of the Grand Rapids Builders and Traders' Exchange as They Appeared Before the Hotel on the Occasion of the Annual Outing at Lake Harbor on June 27. President Schroeder and Secretary Shank Are Kneeling Behind the Suit Case.

sidered and keen attention given to the remarks of the speakers, the afternoon was devoted to pleasures of various kinds, including among others a boxing contest between Messrs. Schroeder and Dwyer, of Muskegon. The little sketch in the lower left hand corner of the "Specifications" is supposed to represent these two worthies at the eighteenth round.

One of the features of the occasion was a picture taken in front of the hotel and in which 148 of the members were grouped. In the center of the front row and kneeling behind the suit case bearing the inscription "I am president of this gang and don't forget it," is President George C. Schroeder; at his right and marked No. 2 is Secretary A. H. Shank, and to his right with No. 1 on his shoulder is C. A. Donaldson; No. 4 is Mr. Wiselogel; while Advising Counsel F. D. Campau is No. 5; G. A. Murphy is No. 6, and the man marked with a 7 on his shirt front is J. A. Ziesse, a director of the Exchange and president of the State Association of Steam and Hot Water Manufacturers.

Barge Cruise of Washington Builders Exchange

The members of the Builders and Manufacturers' Exchange of the District of Columbia enjoyed their third annual barge cruise on the lower Potomac on the evening of June 30. There were more than 200 in the party, including guests from the Builders' Exchanges in Baltimore, Philadelphia, Norfolk and Richmond. E. R. S. Embrey and Charles E. Welsh, president and secretary respectively of the Washington Exchange, were in charge of the cruise. The guests from the Baltimore Exchange were headed by Herbert West, former president of the National Association of Builders' Exchanges, and I. H. Scates, secretary of the Baltimore Builders' Exchange. Arrangements for the reception and entertainment of members and guests were in the hands of a committee of ten from the Washington Exchange, and of which B. K. McCloskey was chairman.

The party boarded the barge about 4:30 o'clock in the afternoon and a tug served as the motive power. The barge was turned into a floating pleasure palace for the occasion, on each side of it being a mammoth banner bearing the inscription "Da Creestofo Colum Contract Ship." A stage was prepared for the troupe of entertainers and the instrumental music included a piano and orchestra. Comfortable chairs were provided and an excellent menu was served while the comedians, vocalists and dancers entertained.

Outing of Cleveland Builders Exchange

For sixteen years the members of the Builders' Exchange of Cleveland, Ohio, have been conducting annual summer outings and yet the enjoyment of the trip this year was none the less keen. The outing was conducted on July 2 to 6, the members and their families boarding the steamer Northland on the morning of the first day for a trip to Mackinac Island, Mich. The party was accorded special attentions by the crew of the steamer and the pennant of the Exchange was flown from the mast-head. An American plan *menu* was served in the dining room and all of the games upon deck were placed at the disposal of the builders. The party numbered 165, including many of the prominent contractors and material dealers of the city. A brief stop was made at Detroit during the afternoon, where Secretary Bowen and a committee from the Exchange of that city greeted the party.

Arriving at Mackinac on Saturday at 11 o'clock, the members were shown to the Grand Hotel, where the best rooms of that commodious summer hotel were placed at their disposal. Entertainment features, including a ball game between the contractors and material dealers, dancing and music in the evening and side trips to Les Chenneaux Islands occupied the time during the stay at the hotel until Sunday afternoon when the party boarded the Northland again for the return to Cleveland. Splendid weather characterized the outing, keeping up the record which, it is stated, has never been broken during the entire time the Exchange has conducted these summer trips, not a single rainy day having been encountered.

The outing was in charge of the Entertainment Committee of the Exchange comprising John W. Thompson, J. G. Card, Karl Pratt, A. R. McCreary and L. A. Skeel.

Membership Campaign by the Springfield Exchange

At a recent meeting of the trustees of the Builders' Exchange at Springfield, Mass., special attention was given to plans for increasing the membership. President L. P. Fletcher was instructed to appoint a House Committee and a Membership Committee. A member of the House Committee is required to be at the rooms at a certain time during the week so that some one is always there to meet the guests. The Membership Committee will participate in the campaign which has been inaugurated and each will be required to give one day to go with Secretary Albert F. Snyder in quest of new members.

Many architects of the city have agreed to join as associate members and to file in the office copies of plans and specifications of all buildings where there has been competitive bidding. This will greatly relieve the architects, for under the new arrangement the plans will be on hand for inspection by builders at the headquarters of the Exchange. Secretary Snyder has been instructed to communicate with manufacturers of the city and surrounding territory asking them to place exhibits of their product in the rooms of the Exchange.

Builders Organize at Jackson, Tenn.

The leading contractors engaged in various branches of the building industry at Jackson, Tenn., organized on June 16 the Jackson Builders' Exchange with officers for the ensuing year as follows:

President	John Cockrill
First Vice-President	W. C. Hickman
Second Vice-President	J. W. Tatum
Treasurer	Ed. Harrison
Secretary	S. M. Lawrence

The directors elected were John Cockrill, W. C. Hickman, Ed. Harrison, T. B. Hardeman, J. B. Fulghum, J. R. Johnston, M. L. Long, Paul Wilson, S. F. Sewell, Thad Hart and R. H. Anderson.

The headquarters are at 111 West Main street, where the Exchange has some 420 sq. ft. of space on the first floor. The organization starts out under favorable auspices and the prospect is said to be most encouraging.

Annual Meeting of Norfolk Builders Exchange

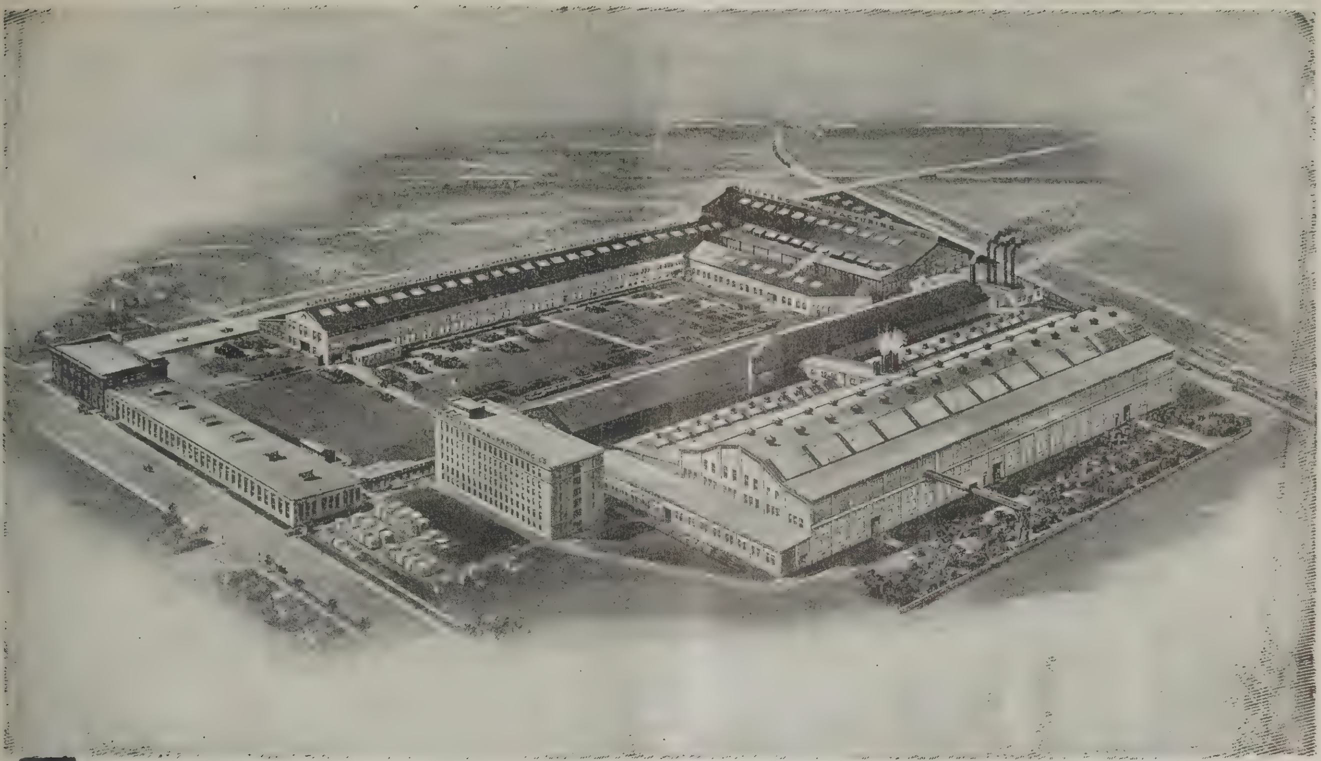
At the annual meeting of the Norfolk Builders' Exchange held at the Lynnhaven Hotel reports for the year were presented and new officers and directors elected. In his report President M. Augustus Williams paid a high compliment to the energy and efficiency of the secretary, George L. Wadsworth, and urged more personal work on the part of Exchange members. He pointed out that every member has a right to feel proud of what the Exchange has done during the past year and much more can be accomplished by steady work and co-operation.

The report of Secretary Wadsworth showed a total membership of 105, and the number of members secured during the term of the secretary, who has held office for about eight months, to have been 29. There are several applications for membership now before the board of directors.

The officers chosen for the ensuing year were as follows:

President	M. Augustus Williams
First Vice-President	J. A. Turpin
Second Vice-President	Ira Cahoon
Third Vice-President	W. T. Cake
Treasurer	A. B. Consolvo

There were also twelve directors elected to serve for stated terms.



"BURT" VENTILATED

On the roof of the big foundry building of the Nordberg Mfg. Co., of Milwaukee, Wis., here illustrated, you can count 50 "Burt" Metal Top Ventilators.

If you could step **into** this building you would find the ventilation **ideal.** Nordberg realized that perfect ventilation was impossible without perfectly constructed ventilators—so he investigated and installed the "Burt."

And the 50 of our 30, 48 and 72-inch Ventilators, here used, are the strongest kind of an argument for this well lighted, "Burt" Ventilated plant. A noteworthy feature of the "Burt" is the Patented Sliding-Sleeve Damper, which allows the ventilator to be opened to any degree and held securely, without fastening the cord. The Glass Tops are so arranged as to admit light whether ventilator is **open** or **closed.**

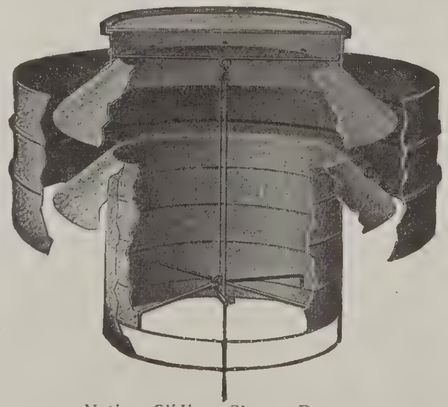
We need not add that "Burt" Ventilators give **lasting satisfaction—** The U. S. Steel Corporation have sent us their 193rd order.

Send for our handsomely illustrated Catalog of 128 pages. It contains many interesting facts and figures on Ventilating. You should have it at once for reference. It's free for the asking.

Please mention Building Age.

The Burt Manufacturing Co.
312 Main Street, Akron, Ohio

GEO. W. REED & CO., Montreal, Sole Manufacturers of "Burt" Ventilators in Canada.



Notice Sliding Sleeve Damper. (Patented.) Furnished with flat *wired* glass up to and including the 72-inch size. Also furnished with metal tops.

B B

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To 10,000 Shrewd Buying Contractors

5,000 BARGAINS
For Building and Remodeling
SHIPPED ANYWHERE

QUICK DELIVERY
Subject to Approval on
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Highest "Graded Up" Quality

Surface Lumber—Not Rough. Even Widths —Not Uneven. Graded Up—Not Down. Highest Grade—Not Knotty or Crooked.

"Guaranteed Right" Cost.
Estimates FREE.
Prices Low and Quality the Very Highest.

Jap-a-Top Roofing

Beautiful — Durable. Surfaced with genuine Slate. 2 colors—Red and Grayish Green.

$2.25 per roll of 108 Square Feet

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Price per sq. of 424 Shingles, $4.75.

Also Other Quality Roofing as low per roll of 108 sq. feet, 90c.

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Wallboard is The Great Modern Substitute for Lath and Plaster. Also fine for partitions to finish off rooms, attics, etc. Comes in sheets ready for use. Goes on dry. Cold-proof, vermin-proof, handsome, durable. **Beats Plaster. Costs Less.** Wallboard costs 50% less to lay. Lasts as long as the building.

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Extra "Star A Star" 6 to 2 in., Washington Red Cedar Shingles, Price per thousand $3.10. Special prices on Bevel Siding or Clap Boards, Red Cedar Siding, White Pine Siding, etc.

Windows and Glass

Check Rail windows, 74c. up. Plain rail, glazed, 66c. up. Transoms, 40c. each, 8x10 window glass, 3½c. per light. Any size, large or small, at equally low prices. Safe Delivery Guaranteed. See Grand Catalog. Dealers charge from five to ten times our prices on glass.

Builder's Hardware

Everything in Builder's Hardware direct to you at wholesale —hinges, locks, door-sets, window sets, etc.

Storm Sash and Doors

Anticipate for winter NOW. All sizes. All styles for every window or door, house or any building Also builder's hardware, hinges, knobs, locks, catches, buttons, etc. Serviceable Storm Doors and Windows of "A" quality and Painted.

All White Pine STORM SASH as low as 72c. STORM DOORS as low as $1.43.

See Big Catalog Bargains

GORDON-VAN TINE COMPANY, 717 FEDERAL ST., DAVENPORT, IA.

Business Originally Established 1863—49 Years

Experience in Service, and Square Dealing

Everything always sold at wholesale prices direct to you

Brief Review of the Building Situation

More Plans for Building Filed the First Six Months of the Year Than in the Same Period of 1913

THE building industry as an important barometer of general business conditions throughout the country affords basis of encouragement in that reports from 112 cities for the month of June show an increase in the estimated cost of improvements for which permits were issued of 1.7 per cent. as compared with the corresponding month of last year. These figures are all the more significant by reason of the fact that for some time past decreases have been the order of the day rather than increases. As might naturally be expected the improvement is confined to no one particular section, for decreased activity is to be found in close proximity to sections where an improvement is indicated as compared with last year. The causes for these mixed conditions are varied and in many cases strictly local, although as regards the cities where increased activity has prevailed it has been due largely to the natural growth of the community through increased population and accompanying requirements, this activity being more than sufficient to offset the handicap of general business depression which pervails throughout many sections of the country. Quite contrary to what might naturally be supposed the leading cities of the eastern and middle states show in the aggregate a gain in the estimated cost of the buildings planned in June, while in the south and extreme west, where the crop outlook is regarded as most encouraging, the opposite is the case.

CITIES IN THE EASTERN STATES

	1914		1913	
Albany	352	860,685	241	165,615
Allentown	30	133,975	28	68,100
Altoona, Pa.	129	134,067	84	130,233
Bayonne, N. J.	23	96,160	18	101,840
Boston	...	790,008	...	1,046,551
Bridgeport	...	640,486	...	212,318
Buffalo	488	2,569,000	394	2,302,000
Elizabeth, N. J.	46	132,453	57	193,181
Erie	165	454,813	121	323,245
Harrisburg	37	131,350	23	81,275
Hartford	...	658,672	...	333,680
Hoboken, N. J.	27	75,721	20	119,713
Holyoke	15	132,925	14	46,975
Jersey City	132	474,483	130	758,545
Lawrence, Mass.	13	218,025	16	96,600
Manchester	123	189,857	99	156,555
Newark, N. J.	227	586,220	265	1,089,772
New Bedford, Mass.	114	269,625	98	234,022
New Haven	121	440,271	101	341,776
New York:				
Manhattan	487	4,255,391	505	6,355,617
Bronx	...	2,882,347	...	2,544,080
Brooklyn	917	5,628,863	903	3,251,277
Queens	...	2,688,284	...	1,265,630
Passaic	48	89,260	38	90,525
Paterson	121	186,326	42	84,426
Philadelphia	1,734	3,779,635	1,450	4,188,890
Pittsburgh	437	2,450,281	343	3,750,072
Portland, Me.	53	215,325	51	160,500
Reading	44	67,575	29	25,350
Rochester	353	1,026,327	319	1,444,103
Schenectady	91	150,585	87	438,889
Scranton	76	108,303	59	85,692
Springfield	184	560,735	124	494,431
Syracuse	...	235,935	...	515,725
Trenton, N. J.	90	256,682	66	247,899
Troy	...	88,663	...	524,358
Utica	89	329,815	64	272,557
Wilkes Barre	106	410,811	346	88,272
Worcester, Mass.	184	746,598	189	540,973

For convenience in discussion we have divided the country into four geographical sections, the first embracing the cities of the eastern states. Here reports from 39 cities show a gain for June of 2.2 per cent., there being 25 cities exhibiting increases and 14 cities decreases. Conspicuous in the list is Greater New York, with the Borough of Brooklyn showing the largest gain. The Borough of Manhattan shows a decrease of over $2,000,000 as compared with June last year. The Borough of the Bronx is little changed, while the Borough of Queens shows a gain of something like $1,400,000. These increases are due largely to development work which has been in progress at the western end of Long Island and especially in the neighborhood of Long Island City, where many factory buildings and homes to accommodate workmen have been erected. In the table in the adjoining column are given the statistics for the cities in question.

Out of 30 cities in the middle states 14 show an increase as compared with last year and 16 a decrease. Chicago planned a few less buildings in June than it did in the same month a year ago, but their total cost was considerably more. In Cleveland there was an appreciable gain in June both in the number of buildings planned and in their estimated cost. Kansas City and St. Paul were also far ahead of last year in the amount of money put into new construction work. Some of the more important decreases are found in the figures for Cincinnati, Milwaukee, Minneapolis, St. Louis and Grand Rapids. The following table shows the record:

CITIES IN THE MIDDLE STATES

	1914		1913	
Akron	253	424,215	270	496,790
Cedar Rapids	69	270,000	73	491,000
Chicago	1,054	9,538,300	1,066	7,609,370
Cincinnati	232	1,116,885	282	1,392,625
Cleveland	1,360	3,126,595	1,061	1,803,805
Columbus	263	625,650	373	567,791
Dayton	...	200,055	...	79,425
Detroit	929	3,146,110	799	3,471,580
Duluth	165	251,205	163	145,284
East St. Louis, Ill.	52	153,720	67	86,887
Evansville	...	133,159	...	222,300
Ft. Wayne	84	394,050	103	273,035
Grand Rapids	...	203,227	...	362,797
Indianapolis	657	841,238	575	952,025
Kansas City, Mo.	322	1,632,700	316	904,375
Kansas City, Kans.	64	125,843	62	54,450
Lincoln, Neb.	48	110,350	40	121,610
Milwaukee	439	899,989	400	1,481,577
Minneapolis	719	1,604,195	652	1,808,645
Omaha	169	404,025	131	339,650
Peoria	63	175,200	34	199,375
St. Joseph	...	52,669	...	49,114
St. Louis	...	1,374,798	...	1,666,327
St. Paul	273	1,981,250	236	1,072,836
Sioux City	...	238,680	...	296,400
South Bend	70	120,778	48	64,635
Springfield, Ill.	47	293,500	31	47,870
Toledo	331	881,113	228	404,651
Topeka	28	70,025	52	51,565
Youngstown	144	333,720	102	628,015

Coming now to cities of the southern states reports from 17 leading centers show a gain in 8 of them and a loss in 9. The losses, however, so far overshadow the gains that for the entire section there is a decrease of 16½ per cent. as compared with June, 1913. The cities showing increases include Baltimore, Louisville, Nashville, Richmond, San Antonio and Tampa, while the more important cities showing decreases include Washington, Memphis, Atlanta, Birmingham, Chattanooga, Dallas, New Orleans and Savannah.

CITIES IN THE SOUTHERN STATES

	1914		1913	
Atlanta, Ga.	299	419,654	319	656,189
Baltimore	339	970,949	329	746,567
Birmingham	308	572,189	285	577,189
Charlotte	30	157,195	42	188,765
Chattanooga	190	60,045	168	132,715
Corpus Christi, Tex.	...	36,593	...	30,597
Dallas, Tex.	186	588,945	195	936,015
Louisville	202	517,540	203	367,780
Memphis	252	283,012	267	715,643
Nashville	63	315,449	57	272,859
New Orleans	...	354,599	...	643,264
Oklahoma City	20	36,590	9	23,500
Richmond	95	172,539	88	153,778
San Antonio	204	250,450	232	160,002
Savannah	75	163,250	63	266,240
Tampa	121	213,050	128	130,929
Washington	472	942,325	410	1,253,513

Moving now to the extreme western section of the country and including the Pacific slope the reports from 16 cities show 5 of them to have witnessed greater activity in June than a year ago, while 11 cities show a loss, the total being a falling off of 20½ per cent. as compared with the corresponding period of 1913. Although San Francisco planned more buildings last month than it did in June a year ago the amount of capital involved was less by over $300,000. In Los Angeles there was an appreciable falling off not only in the number of buildings planned but also in the amount of capital involved. This, however, is not at all surprising in view of the great activity which has heretofore prevailed in that important center.

Cities in the Western States

	1914		1913	
Berkeley	107	153,050	79	204,800
Denver	...	274,014	...	372,845
Los Angeles	946	1,682,057	1,280	2,419,784
Oakland	312	451,231	303	577,517
Pasadena	182	356,537	124	159,014
Portland	536	834,435	472	947,135
Pueblo	20	40,916	35	48,981
Sacramento	98	329,052	120	558,310
Salt Lake City	...	232,600	...	249,748
San Diego	...	426,330	...	385,995
San Francisco	495	1,308,882	456	1,675,554
San Jose	44	47,599	28	29,290
Seattle	788	1,163,165	797	897,310
Spokane	54	83,025	66	411,785
Stockton, Cal.	44	185,222	25	157,415
Tacoma	119	80,611	159	525,884

Six Months' Building Operations

For the first six months of the present year the degree of building activity has been such as to closely approximate that of the corresponding period of 1913, reports from 72 cities showing the loss to be only 2.34 per cent. Of the 72 cities reporting for the six months 40 show increases and 32 decreases. In running over the figures conspicuous examples of increase are found in Boston, Brooklyn, the Borough of Queens in Greater New York, Cleveland, Detroit, Kansas City, Minneapolis, St. Paul, San Francisco and Seattle.

Among the cities showing important decreases in the first six months as compared with the same period last year mention may be made of Buffalo, Newark, Boroughs of Manhattan and the Bronx (New York), Syracuse, Atlanta, Birmingham, Dallas, New Orleans, Akron, Chicago, Duluth, Evansville, Milwaukee, Los Angeles, Oakland, Portland, Spokane and Tacoma.

The table which follows shows the figures for the various cities for the two periods named:

Cities in the Eastern States

	First six months, 1914	First six months, 1913
Albany	3,884,455	2,832,005
Boston	15,544,410	14,787,067
Bridgeport	1,202,926	846,911
Buffalo	6,564,000	7,487,000
Erie	1,373,819	1,273,788
Harrisburg	734,825	628,955
Hartford	2,273,777	2,132,445
Jersey City	2,091,754	3,699,998
Manchester, N. H	671,368	882,099
Newark, N. J.	4,072,237	8,223,991
New Haven	1,988,310	2,093,412
New York City:		
Manhattan	33,451,251	42,941,073
Bronx	10,868,078	16,112,746
Brooklyn	24,442,391	18,639,644
Queens	11,360,997	9,185,456
Paterson	848,911	710,821
Philadelphia	21,38,000	21,126,485
Pittsburgh	9,340,936	7,521,016
Rochester	5,116,442	5,028,524
Springfield, Mass.	2,805,114	2,802,474
Schenectady	805,227	1,391,294
Scranton	585,309	751,608
Syracuse	1,364,220	2,424,035
Wilkes-Barre	735,369	546,057
Worcester	2,863,405	2,728,615

Cities in the Southern States

Atlanta	2,999,797	3,111,777
Baltimore	5,770,820	5,381,404
Birmingham	1,882,611	4,523,335
Chattanooga	633,430	630,875
Dallas	3,793,448	5,160,105
Louisville	2,546,725	2,307,510
Memphis	2,014,837	2,512,024
New Orleans	1,416,990	2,266,955
Oklahoma City	285,242	109,235
Richmond	2,143,653	2,462,884
San Antonio	1,673,795	1,058,844
Washington	2,863,405	2,728,615

Cities in the Middle States

	1914	1913
Akron	2,107,735	2,832,005
Cedar Rapids	1,530,000	1,352,000
Chicago	43,916,600	48,164,207
Cincinnati	5,023,958	4,961,506
Cleveland	14,689,415	9,810,840
Columbus	3,210,855	2,696,803
Detroit	17,149,610	16,325,640
Duluth	1,608,002	2,657,759
Evansville	818,169	1,046,473
Fort Wayne	1,448,200	1,076,882
Grand Rapids	2,302,708	1,448,315
Indianapolis	4,984,239	5,110,907
Kansas City	7,001,875	5,268,445
Lincoln, Neb.	554,947	1,092,415
Milwaukee	5,681,870	6,280,294
Minneapolis	9,773,595	5,930,700
Omaha	2,866,693	2,045,023
Peoria	1,399,350	1,240,623
St. Joseph	340,905	488,346
St. Paul	7,986,042	4,677,912
Sioux City	1,143,635	1,101,228
South Bend	883,584	542,344
Springfield, Ill.	617,490	406,909
Toledo	3,843,638	2,933,337
Topeka	325,625	449.042

Cities in the Western States

Berkeley	1,031,000	1,205,200
Denver	1,464,580	1,557,175
Los Angeles	9,876,796	18,008,790
Oakland	2,536,386	4,616,947
Portland	4,180,910	7,384,720
Salt Lake City	1,395,524	1,149,738
San Francisco	20,677,666	11,516,236
Seattle	5,883,855	5,219,470
Spokane	545,687	2,187,851
Tacoma	788,098	1,318,399

If the same ratio of activity prevails for the remainder of the building season it is fair to assume that the totals for the year will be a close approximation to those of 1913.

◆

The Policy of "Something Just as Good"

It is quite common practice in many sections of the country to find a dealer who, when he does not carry in stock certain brands or make of tools for which a prospective customer inquires, to 'hem and 'haw and reluctantly acknowledge that he does not handle that particular article but adds that he has "something just as good." This is a practice which is obviously unfair not only to the intending purchaser but decidedly unjust to the manufacturer of the goods for which inquiry is made. A carpenter or builder going to a hardware store and asking for a certain make of saw, chisel, brace, plane, bit, shingling hatchet or whatever the tool or device, should insist upon getting exactly what he wants and should refuse anything in the way of a substitute which is offered to him as being "just as good."

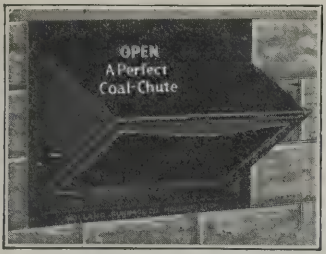
Poor tools are an abomination to the progressive and up-to-date mechanic and when his hardware dealer does not keep in stock those tools which are advertised and have been found to give entire satisfaction under the most severe tests he should request the dealer to obtain a supply for him or else he himself should negotiate direct with the manufacturer for what he wants. The best are none too good for him if he desires to continue to do good work and please his customers. They may cost him a little more perhaps at first but their wearing qualities and general satisfaction are such that they are the most economical in the long run.

It is for this reason that the building mechanic is perfectly willing to pay a fair price for a good tool but when he asks for it at his hardware store and is told it is not carried in stock but that the dealer has "something just as good," it is time for him to insist upon getting what he wants and if the dealer is alive to his opportunities he will see to it that his stock is supplied with the high grade tools which the trade demands.

◆

The Supreme Court of Illinois has just rendered a decision declaring that encroachments upon the building line in Chicago must be removed.

The WINDOW CHUTE



Ready for the Coal Man.

For Your Coal Bin

The Window Chute is a selling feature for any Residence or Building.

**Thousands in Use—
The Very Best**

**If You Build
Buy
Own**

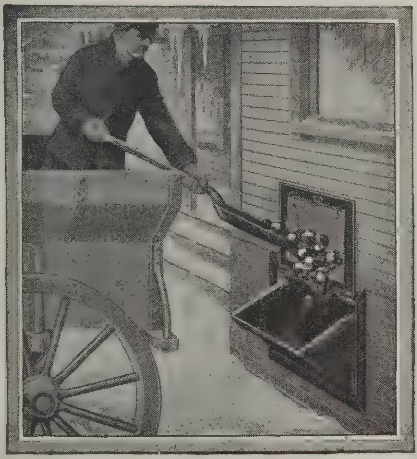
Be up to date and have the world's best.

Write for Booklet C

A Light Basement.

HOLLAND FURNACE CO.
Holland, Mich.
World's Largest Direct Installers of Furnaces

MAJESTIC COAL-CHUTES



Protect the Building

Acts as a window when not in use.

Made in two styles and two sizes.

Send for complete catalogue showing our Burglar Proof all metal Cellar Window.

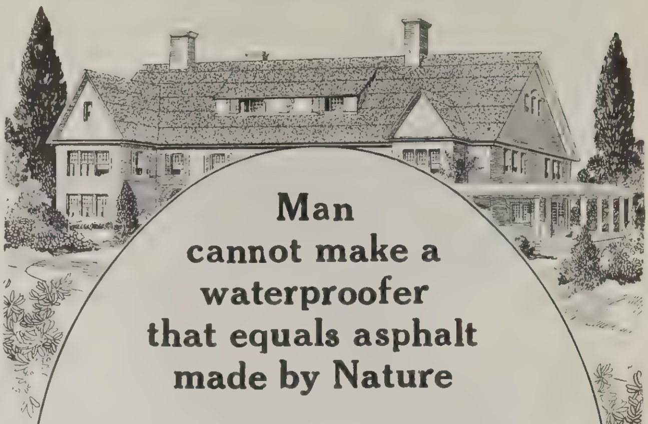
THE MAJESTIC GARBAGE RECEIVER

Buries under the ground keeping the contents cool in summer and from freezing in winter.

Also contains a device for burning waste paper and refuse.

Write for full description.

THE MAJESTIC CO., 422 Erie St., Huntington, Ind.
Branch Office and Warehouse:
311 Reliance Bldg., Kansas City, Mo.



Man cannot make a waterproofer that equals asphalt made by Nature

We know, for we have been testing natural asphalt for thirty-five years; we have tested *all* waterproofing materials, and find that no man-made substitutes are permanent—they dry-out, crack, and leak.

The one absolute and lasting waterproofer is *natural* asphalt; and the waterproofing agent that gives the highest degree of service contains *Trinidad Lake* asphalt—the most stable and uniform asphalt ever found.

We use Trinidad Lake asphalt to make

Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

It is full of life; it gives lasting resistance to sun, rain, snow, wind, heat, cold, and fire. It is roofing of remarkable endurance and economy, and gives an artistic appearance to any building.

Investigate before you build or re-roof. Write us for samples and the Good Roof Guide Book. They are free.

Get Genasco of your dealer—smooth or mineral surface; several weights. THE KANT-LEAK KLEET method is the improved way to apply roofing—does away with cement and prevents nail-leaks.

The Barber Asphalt Paving Co.
Largest producers in the world of asphalt and ready roofing
Philadelphia
New York Chicago
San Francisco

The Trinidad Asphalt Lake

Broad Axe, 10" to 13" Cut, $3.75

Carpenters' Adze, 4" to 5" Cut, $2.00.

Hand Axe, 4" to 5" Cut, $1.10.

Quality

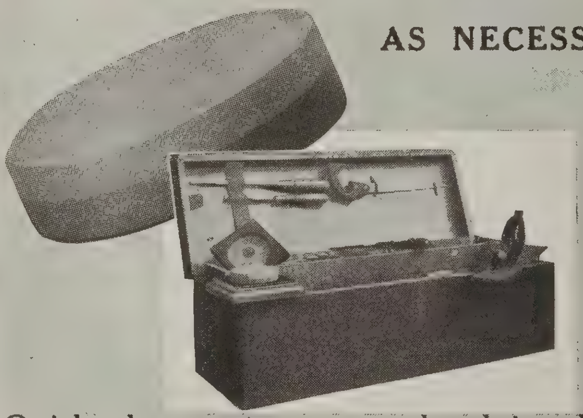
Every carpenter who uses our tools once, continues to use them. Isn't that enough recommendation? It is what has built up our immense trade and we want to *show you.* Are you on?

Price

Cost a few cents more, sure, but every cent of that cost is put into the quality. Isn't that the way you would have it if you were making a tool for your own use? Cost a little more—Wear twice as long.

The L. & I. J. WHITE CO., 100 Perry Street, Buffalo, N. Y.

AS NECESSARY AS A SAW OR A HAMMER IN YOUR TOOL KIT



Carborundum Sharpening Stones

Quick, clean-cutting stones, that bring the edge to the tool with just a few strokes.

AND THEY CUT THE EDGE ON THE TOOL—THEY DON'T MERELY RUB IT ON

Every stone positively uniform in grit and hardness, holds its shape, shows long life. The round Carborundum Combination Bench Stones for general tool sharpening, the beveled edge slips for touching up gouges, carving bits, etc.—the extra hard, extra fine Carborundum stones for that finer edge for your finer tools.

EVERY STONE IS GUARANTEED

ASK YOUR HARDWARE DEALER

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Winner of Prize Essay on Advertising

J. P. Beck, Publicity Manager of the Universal Portland Cement Company, Pittsburgh and Chicago, has been awarded first prize of $1,000 for the best constructive and suggestive essay on advertising by the awards committee of the Associated Advertising Clubs of America at the recent Toronto convention. Mr. Beck's essay covered a hypothetical campaign for fireproof construction with concrete and dealt with the tremendous annual fire loss and annual fire tax and the relief offered from that loss and taxation by safer and saner construction with concrete. Mr. Beck's familiarity with the various phases of the cement industry and his careful investigation of fireproof construction formed an excellent basis for this effort.

This knowledge, combined with his wide experience with common-sense advertising, led the judges—Professor Paul T. Cherington of Harvard University, John Renfrew, Los Angeles, Cal., and A. G. Newmyer, New Orleans, La.—to pronounce his essay the best of the thousands submitted.

Mr Beck has been associated with the Universal Portland Cement Company as publicity manager for a number of years and is also widely known in the cement industry as general manager of the Cement Products Exhibition Company, under whose auspices the annual cement shows have been held during the past few years.

Combination Rip and Carriage Cut-off Saw

A combination outfit which is not only adapted for ripping and cross-cutting but is also an excellent dado machine is illustrated in general view in Fig. 1 of the engravings. The table shown at the left is stationary and is intended for ripping only. It is constructed of narrow strips of maple and has iron cleats which are securely fastened to the main frame. The dado heads may be used at either end of the arbor, removable throats being provided to admit of this. The point is made that the machine is especially efficient for this class of work on account of the unusual weight and rigidity of the frame supporting the arbor. The carriage is framed together and trussed so as to prevent springing. It is mounted on anti-friction rollers which insure accuracy of movement. Adjustable grooved rollers fitting V tracks guide the carriage at the end nearest the saw. The tracks and rollers at the outer end have flat surfaces which are intended only for support. The cut-off rail is provided with an efficient stop gauge arranged as shown in the picture and a lumber roll is attached to the outer end of the carriage. The frame of the machine is made of hard maple or black birch, which is carefully fitted and securely bolted, as may be judged from an inspection of the illustration. The machine is made by the Beach Mfg. Company, Montrose, Pa., and a catalogue issued by the company illustrates and describes its leading lines of sawing machinery, which includes, among others, double arbor rip and cut-off saws with and without extension, box-makers' six stop cut-off saws, box-makers' ripping saws, wood frame and iron frame rip saws, miter saws, combination saws with tilting table, scroll saws of various kinds and carriage cut-off and dado machines. The catalogue consists of 20 pages profusely illustrated, and a copy of it will be sent to any contractor, builder or other woodworker who may desire it.

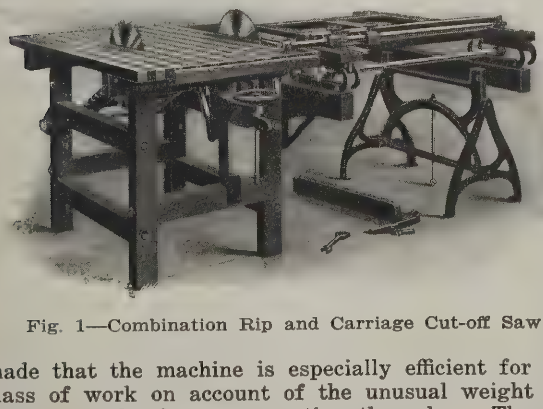


Fig. 1—Combination Rip and Carriage Cut-off Saw

Stanley Garage Door Holder

The Stanley garage door holder, illustrated in its practical application in Fig. 2 and made by the Stanley Works, New Britain, Conn., is a strong, well-made device, which is fastened at the top of the inside of the door and on the upper part of the door casing. It acts by means of an attached chain which throws the bar off center, allowing it to "fold" upon itself, thus permitting the door to close in its natural way. When extended it holds the door full open, making a firm, rigid barrier against the wind or other causes which would otherwise slam the door.

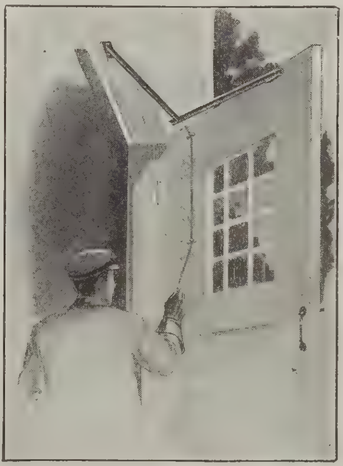


Fig. 2—Stanley Garage Door Holder. Showing How It Operates in Closing the Door

Paradux Canvas-Roof Covering

One of the latest candidates for popular favor in the way of a roof covering is what is known as Paradux, intended especially for covering piazza roofs, balcony floors, decks, porches, bay window roofs, etc. It is made by the Flintkote Mfg. Company, 98 Pearl Street, Boston, Mass., and with factory at Rutherford, N. J. Regular Paradux is composed of a layer of strong, long-fibred felt which has been thoroughly saturated with a non-drying waterproof compound and then coated on the top and bottom side with the company's special waterproof and fire-resisting gums. To the surface of this sheet of waterproof felt is affixed a strong layer of canvas. Paradux is laid with the canvas side up and is then painted. It is put up in rolls 72 ft. long and 36 in. wide, each roll containing 216 sq. ft. of roofing or two squares with ample allowance for laps. It is also furnished in rolls containing one square.

Special Paradux is referred to as "Ideal covering for all roofs on which continual walking is done." It has a heavy duck facing and a strong rubbery compound applied directly to the back of the duck. This coating is fastened to the fibres of the duck in such a way that it cannot be separated and is said to make the duck itself absolutely waterproof. It comes in rolls 60 in. wide, thus making it possible to lay a roof with a very few laps. Special Paradux roofing can be painted in the same manner as a canvas roof and the company advises applying a coat of paint as soon as the roof is laid. Directions for laying are packed in each roll so that any one can lay it. No cement is necessary with Special Paradux owing to the fact that the coating used on the back of the canvas acts in itself as a cement, closely binding the two layers together. The material comes in full and half rolls; full rolls containing 42 running feet of roofing 60 in. wide, sufficient to cover two squares of roof surface with about 15 sq. ft. extra for laps, butts, etc. The half rolls contain sufficient to cover one square of roof surface and 8 ft extra for laps, butts, etc.

An Unusual Feat with a Carpenter's Hand Saw

Probably one of the most severe tests to which an ordinary carpenter's hand saw was ever put in actual work by a builder was in connection with a contract for a bank safety vault in Silver City, New Mexico. The contract was in the hands of Mrs. O. S. Warren, who makes a specialty of cement work and building construction and is the only woman contractor in that county. Through a change of plans by the bank people it was found necessary to cut off about 28 in. of the steel lining of the vault which projected beyond the cement forms for the door opening.

Just how to cut off this projection was the problem which confronted William Laizure, the foreman on the job. It first occurred to him that he could use a hack saw, but that would answer for doing only about 3 in. of the work, and so he decided to take a high grade hand saw and make a hack saw of it. He had never heard of anyone doing anything like this but he was sure that it would work. He therefore took a No. 140 Diamond Edge hand saw, made by the Shapleigh Hardware Co., and after properly filing it went to work. The accompanying picture, Fig. 3, shows what had to be done. At the top there was a cornice of 15 in. of cast iron as well as the steel plate, which was ⅜ in. thick, and at the back was another cast piece about 12 in. high When Mr. Laizure got through the cast piece the plate pinched the saw and then he was in trouble. He overcame the difficulty, however, by drilling a hole and using a compass saw, but he had to file it six or eight times before he could enter the hand saw. In the meantime he set the saw and started again, but the Mexican, who was helping, had gotten off the line, so another hole had to be drilled and the work went along again until all the set was worn off. Mr. Laizure then drilled a hole and used the compass saw to get started again.

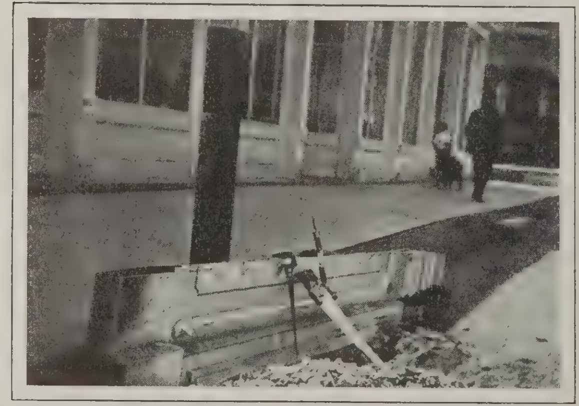


Fig. 3—An Unusual Feat with a Carpenter's Hand Saw

He marked the space the saw cut between filings and found it to be 5¾ in. They cut the 9 ft. 6 in., including the cast-iron part, in less than 16 hours.

Mr. Laizure stated that it would probably be nothing unusual for a mechanic in the big cities to cut a plate like the one in question, but out in the country at the end of a railroad with nothing but carpenter's tools to work with it looked like a tough job.

A New Circle Swing Derrick

The "Peerless" is the name given to the new circle swing steel derrick which has just been brought out by the Sasgen Derrick Co., 2053-2057 North Racine avenue, Chicago, Ill. In this device the company claims to have the only full swing portable steel derrick with self-lubricating bearings, in addition to folding mast and bottom, that can be used by hand, horse, or other power without a change of boom. The construction is such that when the boom is taken off and the mast and bottom sills are folded together, the derrick is in two parts, making it compact and light enough to be readily carried from one job to another. For hoisting building materials of all kinds it is claimed that the "Peerless" is most practical and convenient. An additional advantage is that it can be easily mounted upon trucks or platforms for loading and unloading. The derrick is 8 ft. high and has a swing of 12 ft. with an 1800 lb. capacity. It weighs 275 lb. and is equipped ready for hoisting with 125 ft. of crucible steel cable swivel block and fasteners. The drum has a capacity for 200 ft. of cable. A picture of the derrick in use is shown in Fig. 4. The company has issued some attractive literature relating to its products and readers of *The Building Age* who are interested in circle swing derricks can obtain copies on application to the address above given.

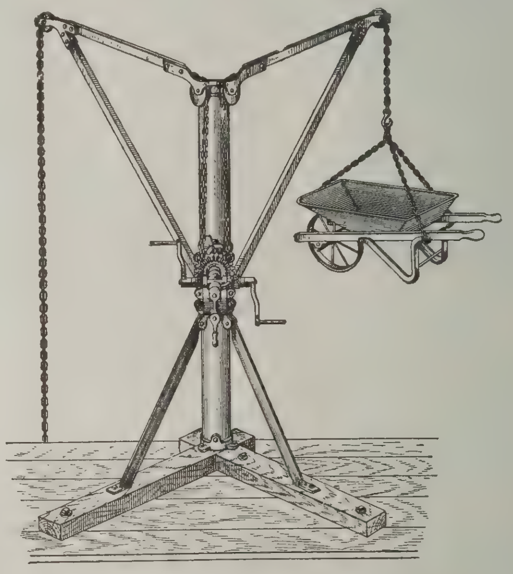
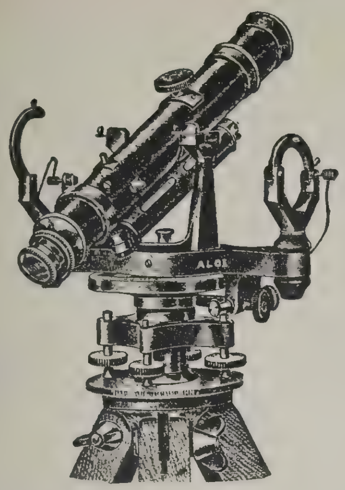


Fig. 4—A New Circle Swing Derrick

Daily Capacity of Floor Scraper

Information on the daily scraping capacity of the spring-driven floor smoother in the hands of an experienced operator has been compiled from the records of the Floor Surfacing Department of the Triple "A" Machine Co., 300 West Grand avenue, room 320, Chicago, Ill., and has been distributed throughout the trade on typewritten leaflets. The specifications and

(*Continued on page* 76)



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Builders — Contractors — Architects

This is not the old style Architect's Level. It is the newest model *convertible* level. There is not a single Builder, Contractor or Architect who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

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We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

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We allow you to convince yourself by a trial of the instrument before you obligate yourself.

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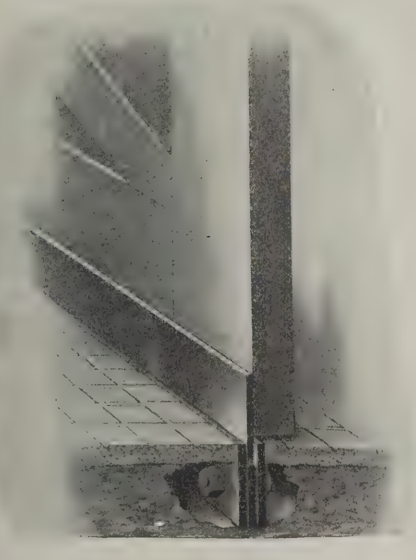
B. A., Aug., '14.



No. 736
R-W Sliding Door Guide and Weather Strip
No. 737 Same type, but lighter weight

Some R-W Garage Door Equipment

With this construction door can be hung to clear floor, and the steel strip completely covers and protects the opening. Opening in lower guide allows water to drain. Steel door strip is 4 x 3/16 inches. Lower steel strip guides, 3½ x ⅜ inches. Bolts are spaced on 24-inch centers.

Keeps the Garage Warm—

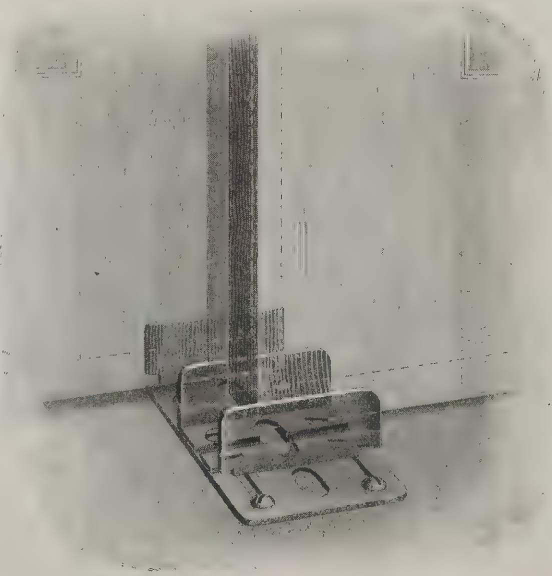
Prevents Warping of Doors—

Especially Adapted for Parallel Sliding Doors.

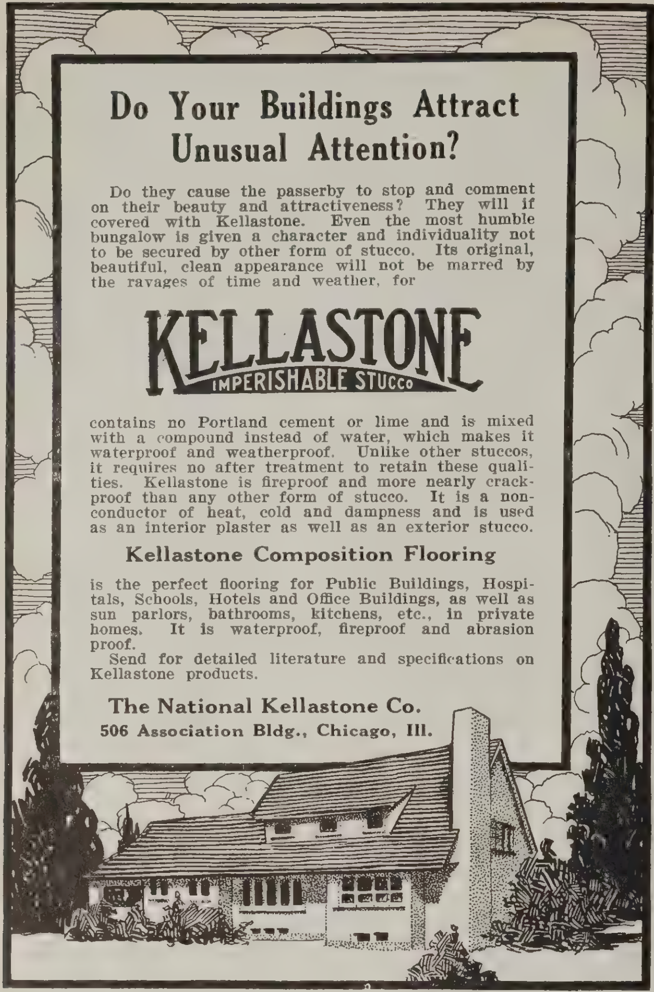
For use with parallel sliding doors. Guides the bottom of the doors and prevents chafing. Suitable for use with concrete or wood floors. Adjustable for doors 1¾ in. to 3 in. thick.

Ask for them at your dealers

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.
A Hanger for Any Door That Slides



No. 172
R-W Adjustable Parallel Door Floor Guide.



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Do they cause the passerby to stop and comment on their beauty and attractiveness? They will if covered with Kellastone. Even the most humble bungalow is given a character and individuality not to be secured by other form of stucco. Its original, beautiful, clean appearance will not be marred by the ravages of time and weather, for

KELLASTONE
IMPERISHABLE STUCCO

contains no Portland cement or lime and is mixed with a compound instead of water, which makes it waterproof and weatherproof. Unlike other stuccos, it requires no after treatment to retain these qualities. Kellastone is fireproof and more nearly crack-proof than any other form of stucco. It is a non-conductor of heat, cold and dampness and is used as an interior plaster as well as an exterior stucco.

Kellastone Composition Flooring

is the perfect flooring for Public Buildings, Hospitals, Schools, Hotels and Office Buildings, as well as sun parlors, bathrooms, kitchens, etc., in private homes. It is waterproof, fireproof and abrasion proof.

Send for detailed literature and specifications on Kellastone products.

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The Moderate-Cost Structural Medium

At last a pressed steel joist which has proven adaptable for use in every size building, from the smallest bungalow to the mammoth skyscraper.

Berger's Metal Lumber

will be found in every part of the world, in government buildings, in apartment houses, hospitals, garages, churches, and right here in Canton in the eleven-story Renkert Building; eleven floors of Berger's Metal Lumber Joists and Floors were put in in seven weeks. The total area was 112,000 sq. ft. and the building is considered a model for strength and fireproofing qualities.

Our new Metal Lumber catalog will be of great interest to you. Write for it.

THE BERGER MFG. CO., Canton, Ohio

For the best service address the nearest branch.
New York, St. Louis, Boston, San Francisco, Philadelphia, Minneapolis.

Also manufacturers of Prong Lock Studs and Furring, Rib-Trus, Ferro-Lithic and Multiplex Reinforcing Plates, Metal Ceilings, Expanded Metal Lath, Sidewalk Forms, Raydiant Sidewalk Light, etc.

approximate number of square feet scraped per day are outlined as follows:

	Approximate number of sq. ft. scraped per day	
Specifications	Clean	Gritty
Joints and edges	2400 sq. ft.	2000 sq. ft.
Common flat building work. (Scraped once over and sanded)	1600 sq. ft.	1200 sq. ft.
Good flat building work. (Scraped once over, touched up and sanded)	1200 sq. ft.	900 sq. ft.
Common residence work. (Scraped once over, touched up and sanded)	1200 sq. ft.	900 sq. ft.
Good Residence work. (Traversed; scraped lengthwise and sanded)	800 sq. ft.	600 sq. ft.
First class residence work. (Traversed; scraped lengthwise, cabinet finished and sanded	600 sq. ft.	500 sq. ft.
Dance hall work	600 sq. ft.	500 sq. ft.
Store and school work	1200 sq. ft.	900 sq. ft.
Roller rink work	800 sq. ft.	600 sq. ft.
Office and church work	1000 sq. ft.	800 sq. ft.

Note: For 1½" face flooring, allow 10% more time.
For ⅜" thick flooring, allow 10% more time.

Old and Varnished Floors

Office work, etc.	600 sq. ft. per day.
Flat building work	400 sq. ft. per day.
Residence work	300 sq. ft. per day.
Dance halls, etc.	400 sq. ft. per day.

Two eight-page folders containing valuable data on floor scrapers have also been compiled and illustrated. Attention of building contractors is especially called to the fact that there are three machines in one in the Triple "A" product; a floor scraper, a floor sander, and a blade sharpener. On account of its weight and power it will cut below the grit and will successfully scrape and sandpaper new or old floors. The constructive features are such that the handle, clamps and weights are easily attached and the scraper blades readily adjustable. The blades furnished are of three different thicknesses and shapes so that only one outfit is necessary for various operations.

The New Boker Sash Chain

A new candidate for popular favor in the way of a sash chain is that which we illustrate in Fig. 5. The principle of the "clove hitch," which as is well-known becomes stronger as the strain increases, has been applied to short pieces of basic steel wire and the result is the Boker flat link chain. It is an American invention patented in the nine principal countries of the world and the sole American rights belong to the Valley Forge Cutlery Company, Newark, N. J., which has a modern plant and a complete battery of automatic machines devoted to its manufacture. The Boker chain while having much the same appearance as the ordinary flat link chain is much stronger and as the metal is doubled in the eye its capacity for wear is greatly increased. Another point on which emphasis is laid is that owing to the reinforcement it will neither flatten nor elongate under strain. It is made in both bright and rust-proof finishes and in an entire range of sizes running from the No. 0000 with a tensile strength of 1750 lb. to the No. 9 with a strength of 202 lb. It is also supplied in all of the forms demanded by the trade. A complete line of the chain on large reels in 100 ft. packages and in the different forms is carried in stock by the Valley Forge Cutlery Company both at the factory in Newark, N. J., and with Herman Boker & Co., No. 101 Duane Street, New York City. We understand that a sample of the chain will be sent to any architect or builder making application for it.

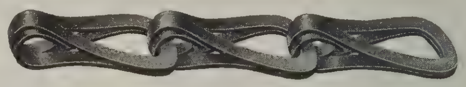

Fig. 5—The New Boker Sash Chain

Stine's Brass Screw Holes

The attention of architects and building mechanics generally is being directed by the Stine Screw Holes Company, Decatur, Ill., to the fact that brass screw holes can now be purchased as well as screws. These screw holes are designed to be driven in with a hammer and are adapted for use wherever screws are commonly

(*Continued on page* 78)

IMPOSSIBLE for us to name in a few lines all of the good things we have in the way of the newest and best tools but you should know about

The celebrated Buck Brothers' Chisels and Gouges—ask for catalog No. 3199. The indispensable Jorgensen Adjustable Hand Screws—ask for circular No. 3200. The old reliable Colts Quick Acting Clamps—ask for catalog No. 3201. The genuine S. J. Addis London Carving Tools—ask for catalog No. 3202. Work Benches—ask for catalog No. 3203. Mitre Boxes—ask for catalog No. 3204.

We also carry regularly all the Yankee Tools, Stanley Rule and Level Co.'s and Miller Falls Lines, Hammond's Hammers and Hatchets, Russell Jennings' Bits, etc. You can purchase from us in one order all the best tools that the market offers. Correspondence invited.

HAMMACHER, SCHLEMMER & COMPANY
HARDWARE, TOOLS AND SUPPLIES
Fourth Avenue and 13th Street New York, Since 1848

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OUR new Rafter Square, No. 500R, is the most complete Square ever made for the carpenter.

It contains accurate measurements for all kinds of rafters, common, hip, valley, jack and cripple—in the most convenient form.

These measurements are all given on the Square; they are complete, correct and final. They save the trouble of multiplying and dividing and then obtaining a result about which there is some doubt.

Simple and easy to use. A great time saver.

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Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application.

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Will swing softly on

STANLEY'S

BALL BEARING HINGES

with Non-Rising Pins

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AT ATLANTA, 1895

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employed. They are threaded to receive either wood or machine screws. When they are driven in the outer or screw-receiving end of the screw hole is flush with the face of the receiving material. A style is also made which is the reverse of that just mentioned, the inner receiving end being beneath the surface of the receiving material. The screw enters it from the opposite side instead of from the face of the receiving material, as in joining parts of furniture, fastening drawer pulls, securing box seat hinges, etc., etc. Circulars which the company has just issued set forth at length the various ways in which the brass screw holes can be utilized to advantage.

The "Milwaukee Maid" Concrete Mixer

The Cream City Boiler Company, 310 Thirty-seventh Avenue, Milwaukee, Wis., is sending out a folder calling attention to the merits of the "Milwaukee Maid" concrete mixer which is mounted upon a truck and may be readily transferred from one job to another, thus especially adapting it to meet the wants of the small contractor who may be called upon to do more or less concrete work. The mixer is provided with large drum which has no sharp corners or angles in which the concrete may lodge or stick. The central shell is of extra heavy boiler plate steel which renders it practically indestructible. It is easily operated, the all-steel discharge chute enabling the workman to take out the exact quantity desired. The special flange or splash plates in the drum head openings prevent disagreeable spilling or slopping. The steel frame is heavy, closely riveted and rigidly braced, and will stand up, it is said, under the hardest usage. It is mounted on a truck having large diameter steel wheels with wide faced tires which make it a very easy running portable mixer. It has the same style of engine as is used on higher priced machines and undue vibration is eliminated. The length of the truck is 7 ft.; its width 3 ft. and its hight from the ground 2 ft., the hight of the hopper is 43 in.

The "Arex" Roof Ventilator

A roof ventilator embodying many interesting features and known as the "Arex" has around the body a frustum-shaped jacket which has four lips, each pointing to the North, South, East and West, respectively. It also has a double conical top and a wide storm band. The scientific construction is said to embody all fundamental principles of natural exhaust ventilation and is the result of many years' practical experience in America and Europe on the part of the inventor. The ventilator, which is shown in general view in Fig. 6 and made by J. C. Kernchen, National City Bank Building, Chicago, Ill., has no movable parts. It is claimed to be stormproof, and the ridge seen below the lips in the illustration is extended on the inside also to catch water, holes being provided for drainage to the roof. Mr. Kernchen builds these ventilators in

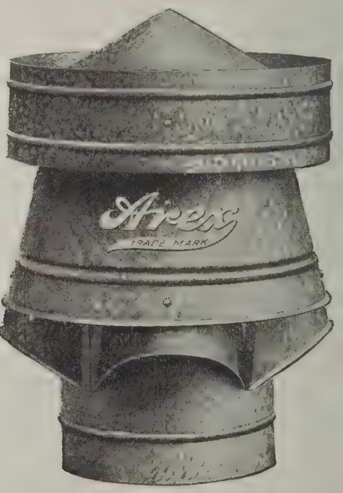
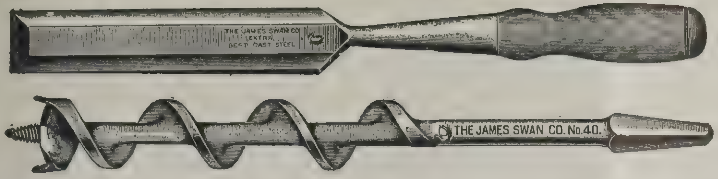


Fig. 6—The "Arex" Roof Ventilator

(*Continued on page* 80)



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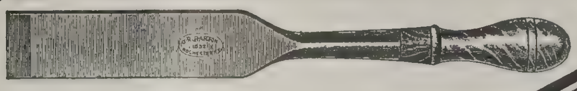
THE JAMES SWAN COMPANY, Seymour, Conn.

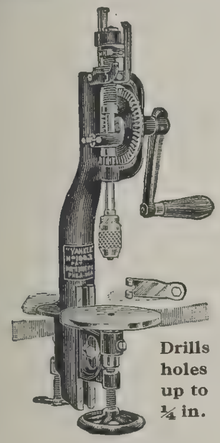


MACK & CO.

The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

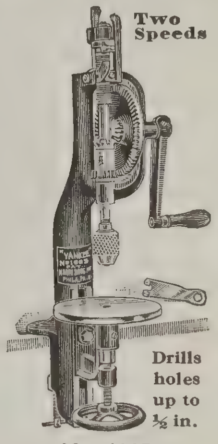
G. R. BARTON 1832 ROCHESTER, N.Y.

Brown's Race
Rochester, N.Y.



Drills holes up to ¼ in.

No. 1003



Two Speeds

Drills holes up to ½ in.

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You use but one hand to operate the

"YANKEE" Bench Drill

With the new automatic features the friction feed brings the drill down quickly to the work, then the ratchet feed operates and prevents breaking of the drill point. This leaves free use of the left hand to hold the work. The quickest and most convenient Bench Drill Made.

Send for the "YANKEE" Tool Book

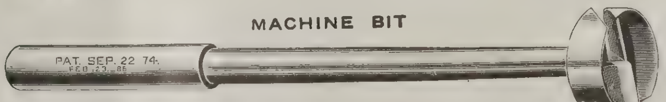
NORTH BROS. MFG. CO.
Lehigh Avenue PHILADELPHIA, PA.

THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.

BRACE BIT

MACHINE BIT



Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

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ENDORSED BY LEADING ARCHITECTS

GUARANTEED FOR 10 YEARS—WILL LAST MANY YEARS LONGER

Natural Colors of Garnet, Red, Gray and Green, Which Never Fade

We are the ORIGINAL MAKERS of Flexible Asphalt Shingles and tested our product for ten years before putting it on the market. Let us send you a booklet.

H. M. Reynolds Asphalt Shingle Co.
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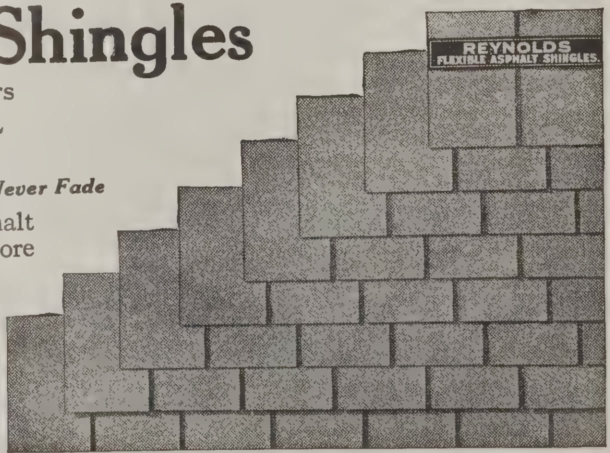
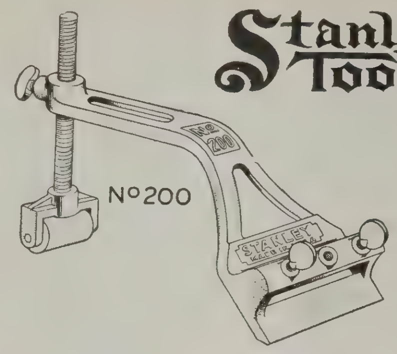
Established 1868



Stanley Tools



STANLEY CUTTER AND CHISEL GRINDER

A device for holding Plane Irons, Chisels and other similar cutting tools, that they may be ground or honed to any desired angle or bevel, insuring an accuracy that is very difficult to obtain when the tool is held in the hand.

The tool to be sharpened is rigidly held in the Grinder by thumb screws and may be given any desired angle by means of the large screw attached to the roller frame, which raises or lowers the main body.

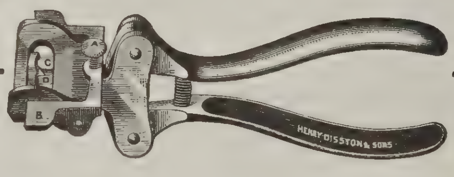
Made entirely of metal, all parts being nickel plated.

Price, each, 90c.

Manufactured by

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

No Guesswork About This



It is highly important that the teeth in a saw be properly set. If set too much, or not enough, or the set extends too far into the blade, then the efficiency of the saw is impaired, to say nothing of the damage that may result to the blade.

Disston "Triumph" Sawset

eliminates all guesswork. It does its work in a sure, even manner—giving just the right set required, no more, no less.

Send for circular giving complete description and instructions

HENRY DISSTON & SONS
Incorporated
Keystone Saw, Tool, Steel & File Works
PHILADELPHIA, U. S. A.

any size of galvanized iron or copper, in various gauge metals. The Masonic Temple, one of Chicago's tallest buildings, has recently had installed two 48-in. "Arex" ventilators on its cupola to ventilate the entire upper floor. Two fine orders have also been recently closed for 140 ventilators to be installed on the Bessemer Limestone Co.'s brick plant at Bessemer, Pa., and for 60 ventilators for the Alton Brick Co., St. Louis, Mo. In the literature prepared by the company for distribution throughout the trade full particulars are given regarding the sizes of "Arex" ventilators, together the area per square inch, gauge of metal and f.o.b. prices.

The Door Beautiful

We have before us a copy of the seventh edition of "The Door Beautiful"—a handsome *brochure* just issued from the press by the Morgan Company, Oshkosh, Wis., and showing with striking effect some of the many designs of "Morgan Doors," turned out by this enterprising concern. In the arrangement of the matter the results produced are more attractive and useful for the architect, the builder, the contractor and the houseowner than has been the case in connection with any previous edition. The great majority of the 50 pages of which the work consists, are devoted to full page illustrations, across the top of each of which is a narrow panel showing a modern residence and its immediate surroundings, while below and occupying the rest of the page is a picture of a Morgan Door and its immediate surroundings, some representing the use of an exterior door while others represent interiors. The pictures are photo-reproductions and demonstrate in a most convincing style the beautiful effects which may be produced by the use of these types of doors. The designs embrace those executed in red oak, birch, white oak, African mahogany, red birch and brown ash. In the early pages are interesting comments concerning "40 years of Morgan doors"; instructions are given regarding specifications for hardwood doors, and among the closing pages are 24 colored plates showing different finishes of hardwoods, these finishes being adaptable for both interior and exterior mill work. The last page is devoted to some comments on "Modern Finishing for Morgan Doors" in connection with which the belief is expressed "that the best results in treating and finishing Morgan doors will be obtained by using Bridgeport Standard Wood Finishing products only."

How a Disston Hand Saw is Made

Those who are interested in knowing how hand saws are made can obtain a great deal of accurate information from a little pamphlet which is being sent out under the above title by Henry Disston & Sons, Philadelphia, Pa. The book explains all steps from the melting of the steel to the shipping of the finished goods. From the standpoint of the information contained it is undoubtedly one of the most valuable little works ever issued for those interested in saws. It is profusely illustrated by means of halftone engravings showing various stages of the work.

The Hess Bath Room Locker

An attractive booklet bound in paper covers, the front one of which is embossed to represent the tile wall of a bath room and in which is set a sanitary medicine cabinet, is being distributed by the Hess Warming & Ventilating Company, 1201 Tacoma Building, Chicago, Ill. The printing is in colors, each page having a border in a delicate shade of robin's egg blue relieved with a running design in white and framing the text which appears in a black ink that shades upon the brown. The right-hand pages throughout are devoted to illustrating several of the styles of the Hess steel medicine cabinet, or bath room locker, the idea being to give them much the appearance they would have in actual use. The cabinets are made of enameled steel which does not warp, shrink, swell, sag or open in the joints. It is non-absorbing and will not stain. The inside being enameled is easily kept clean and in case it becomes marred or dingy it may be re-enameled

(*Continued on page* 82)

Pearson's Automatic Shingle Nailer

MADE BY PEARSON MFG. CO. ROBBINSDALE MINN.
SEE THAT NAIL

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only **$5.00** It makes good.

Pearson Mfg. Co.
Robbinsdale, Minnesota

Why Take a Chance

of having a defective wall from using a scrap wall tie in varying thickness as light as tin.

Ask your dealer the weight of a box containing 1000 ties and if the weight is below 50 pounds you are buying an inferior tie and entitled to rebate.

To be safe, specify the

Whale Bone Wall Tie

and if your dealer cannot supply same, order direct from us and we will ship the same day as received, at price of $2.50 per 1000 Pittsburgh, Pa.

ALLEGHENY STEEL BAND COMPANY
BELL PHONE: 718 Cedar North Side, PITTSBURGH, PA.

SEND $1.00

for this

remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending $1.00 for this attractive offer. We prepay postage.

Otis A. Smith Rockfall, Conn.

Write For Catalog

BERGER'S MULTIPLEX REINFORCING
AND FURRING PLATES
THE BERGER MFG CO.
CANTON, OHIO.
FOR THE BEST SERVICE ADDRESS NEAREST BRANCH
NEW YORK ST. LOUIS BOSTON
SAN FRANCISCO MINNEAPOLIS PHILADELPHIA

Something For You

in our Pamphlet 29; viz: Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

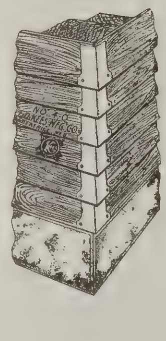
Some of these Tables are not in print elsewhere.

The Pamphlet and a Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

Save Time and Money



and make a neat, attractive corner job, with mitre effect, by using Kees Metal Building Corners. No cutting of bevels. Hold paint like wood. Use with lap siding.

Write today for free samples and particulars.

F.D. KEES MFG. CO. BEATRICE, NEB.
Box 812

If you have never used Gossett Window Screen Hangers or Kees Siding Clips, ask for samples.

A RED DEVIL TOOL for EVERY MECHANIC
RED DEVIL BONDED TOOLS ELIMINATE ALL GUESSWORK
A BOOK of 3000 SENT ON REQUEST. SEND NOW
Red Devil

RED DEVIL BONDED
Chisels, Gauges, Drawing Knives, are covered by a TWO YEAR
Insurance Bond

If your dealer can't supply, send 50 cents for sample Red Devil Bonded No. 2622, 1-in. Beveled, Socket Firmer, Pocket Chisel.

Red Devils are tools that pay YOU—not simply tools you pay for.

SMITH & HEMENWAY CO. New York

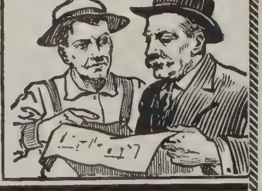
Start to Succeed NOW

Forget the past. Better times are ahead. Start up out of the old ruts NOW. Mail the coupon. We want to tell you how you can learn Plan Reading, Estimating, Contracting, etc., IN YOUR OWN HOME. We furnish plans of buildings now being built. Never mind the cost—it's small. We want ambitious men now in the building line. Write today.

$15.00 Outfit and All Blue Print Plans Free

CHICAGO TECHNICAL COLLEGE
1020 Lake View Building, Chicago, Ill.

Mail the Coupon



CHICAGO TECHNICAL COLLEGE, 1020 Lake View Bldg., Chicago, Ill.
Gentlemen: I have marked with a cross (X) the branch or branches interesting me.

- ☐ Architectural Draft'g
- ☐ Builders' Course
- ☐ Estimating
- ☐ Plan Reading
- ☐ House Planning
- ☐ General Contracting
- ☐ Bldg. Superintendence
- ☐ Structural Drafting
- ☐ Structural Design
- ☐ Mechanical Drawing
- ☐ Machine Drafting
- ☐ Machine Design

Name ....
Address ....
Town.... .... State ....
College or Home-Study Course ....

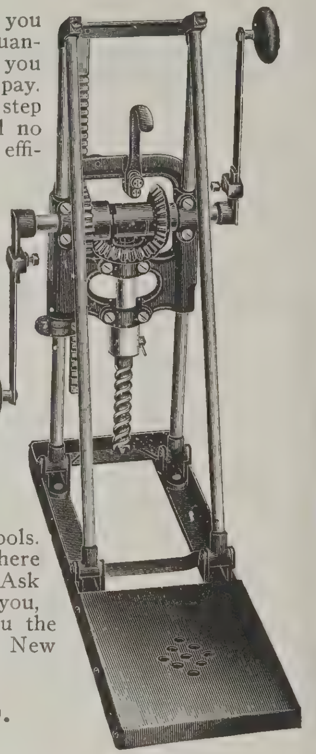
A Star Among Boring Machines

Your profits on that job you are doing depend upon the quantity and quality of the work you get for the wages you pay. *Efficient tools* are the first step in the road to success, and no tool of its class excels, in efficiency, our new

"MILLERS FALLS" BORING MACHINE No. 146

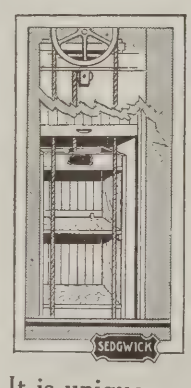
It is made to do more and better work—and it does it. All metal; bores vertically or at any angle within an arc of 50 deg., has adjustable stop for regulating depth of hole; automatic suspension device and adjustable cranks. Bores 12", but can be made for greater depths if so ordered.

You need both these tools. Reliable Dealers everywhere carry Millers Falls Tools. Ask yours. If he cannot serve you, write us and we'll send you the name of a Dealer who can. New Catalogue on request.



Millers Falls Co.
Millers Falls, Mass.

You can't afford to install inferior DUMBWAITERS



Because there is not sufficient profit in them to make it worth while. And the annoyance and disgust they cause will hurt your reputation.
The BEST is none too good!

"THE SEDGWICK IS THE BEST"

Send for Catalogue L.

It is unique.
It will help you to get business.
It will help you to hold business.
It will solve your DUMBWAITER Problems.

Write for copy now.

Sedgwick Machine Works
123 Liberty Street
New York City

at slight expense, making it look like new. The cabinet is pressed and formed into shape by powerful automatic machinery and is heavily coated inside and out with snow-white enamel, each coat being subjected to a separate baking in gas heated ovens. The corners of the doors and frames are solidly welded and the various parts put together in a way to produce very durable construction. The trimmings—that is, hinges and turn handle—are of solid bronze, polished and nickel plated and attached with plated brass bolts. The shelves are adjustable and when not specified they are of white enameled steel. In the outside face of the door is a polished plate glass mirror, although if specially ordered the company will supply doors with clear plate glass through which the contents of the cabinet may be seen.

The Lacey Silos

A form of wood silo construction which is meeting with much favor in various sections of the country is that manufactured by Elmer B. Lacey, Endicott, N. Y., special attention being given by Mr. Lacey to the silo doors and improved silo hoops which he supplies so that any wide awake carpenter or builder can readily construct a silo by making use of them. The patented door frame and door are made to conform to the circle of the silo, thus leaving no projecting parts on the inside to interfere with the perfect settling of the ensilage. The openings are 23 in. high and 26 in. wide divided by a strong curved piece of hardwood fitted between the rabbeted door sides and held in place by a piece of band iron which is bolted and screwed securely to the door sides and strut. The ends of this piece of band iron are so formed and reinforced by malleable lugs as to receive the ends of the hoops at each side of the door opening, thus making the adjustment of the hoops at the most convenient place to take care of the silo. The doors are all interchangeable and strongly made yet flexible so that pressure from the ensilage keeps them against the rabbeted sides and jambs at the top and bottom, thus making a sure fit without the aid of any slides, bolts, hooks or bars.

The hoops are referred to as an entirely new departure in hooping silos and have been found equal to any requirements. The hoops are made from galvanized wire strands composed of seven wires twisted together, making a hoop that is very strong and at the same time easy to handle. Being flexible it touches every stave and gives uniform pressure all the way round. At each end of the hoop a piece of round iron with 8 in. threads and hexagonal nut is attached to the wire in such a way as to give a fastening that can be easily adjusted and make an absolutely secure joint without bolts, screws or clamps. The ends are joined together with a special malleable lug.

The "Red Devil" Hammer and Snip

A rather ingenious handy hammer and snip, a view of which we present in Fig. 7 of the engravings, has just been added to the already extensive "Red Devil" line by the Smith & Hemenway Company, 150 and 152 Chambers street, New York City. The blades of the tool are made very narrow and will therefore readily cut either round or straight. It has an involute spring in the handle throwing it open. The tool is made of high grade steel, hardened and tempered so that it will cut sheet metal without injury to the tool. It weighs 10 oz. and the total length is 8 in. with a ¾-in. cutting blade.

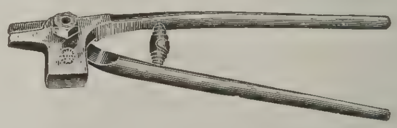
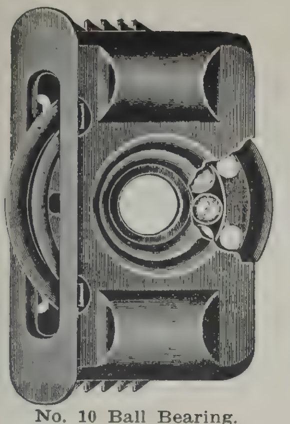


Fig. 7—The "Red Devil" Hammer and Snip

Catalogue and Price List of Saws and Files

Some interesting information relative to the leading lines of saws and files made by Moore Brothers, James-

(*Continued on page 84*)



No. 10 Ball Bearing.

"Grand Rapids" All Steel Sash Pulleys

Fasten automatically. No nails. No screws. Just bore 4 holes.

The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

Write for free samples.

Grand Rapids Hardware Co., 160 Eleventh Street Grand Rapids, Mich.

WEATHER VANES

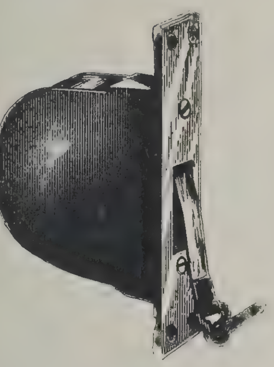
ALL SIZES AND DESIGNS

SEND FOR CATALOGUE

E. G. Washburne & Co.

208 Fulton Street
New York

Caldwell Sash Balance



Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

CALDWELL MFG. CO.
5 Jones St., Rochester, N. Y.

TRADE **SIMPLEX** MARK
Reg. U. S. Pat. Office

ROOFING NAILS

FOUR NAILS at PRICE OF ONE
when you buy them
ONE NAIL in Place of FOUR
when you drive them

BECAUSE the Simplex has four times the head area of an ordinary roofing nail, and head area is the all important point in laying prepared roofing or sheathing papers.

Demand Simplex nails from your hardware dealer.

Don't buy prepared roofing unless Simplex nails are packed in the rolls.

FREE Samples sent on receipt of request accompanied by dealer's name.

H. B. SHERMAN MFG. CO.
Battle Creek, Mich.

THE

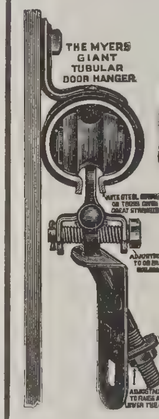
Excelsior Dumb Waiter

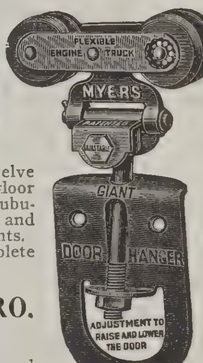
Sent complete, to a nail $18.50
Knocked down, ready to erect

Self-Retaining Machine, Hardwood Car, Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. *Send for Descriptive Pamphlet.*

R. M. RODGERS & CO.
74 Emerson Place, Brooklyn, N. Y.

THE MYERS GIANT DOOR HANGER
PATENTED





This is one of twelve different styles of door hangers for flat or tubular track with lateral and perpendicular adjustments. Write for our Complete Door Hanger Catalog.

F. E. MYERS & BRO.
ASHLAND, OHIO

The Ashland Pump and Hay Tool Works

Thomas Morton
245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS

CHAINS

For Suspending Heavy Doors, Gates, Etc.

All of SUPERIOR QUALITY

WRITE QUICK

Before you put up another house, get Hewitt-Lea-Funck's price on the lumber. Send lists today for quick quotation and

Double your profit

No middlemen's profits. We produce the lumber and sell you direct, better lumber at a wonderful saving.

Quick service

We'll ship your order within 48 hours. Shipments arrive within two weeks to points west of the Mississippi. We guarantee grades, count and satisfaction or money refunded.

Send 10c for this practical book of 100 plans

HEWITT-LEA-FUNCK CO.
459 CRARY BLDG. SEATTLE, WASH.

DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.

TAINTORS POSITIVE No 7
TAINTOR MFG CO NEW YORK U.S.A.

Self-adjusting, except turning anvil to change setting

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.

Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., **New York**

C. E. Jennings Arrow Head Combination Sets of SAWS

Adjustable Handle

The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set in a Box or Leather Case if So ordered Extra.

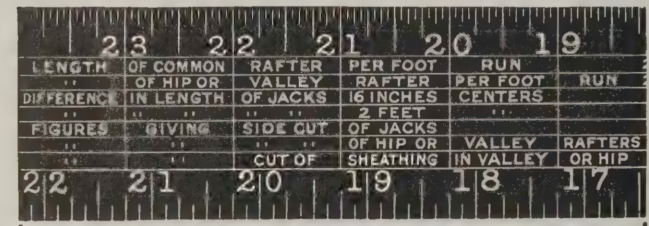
We will send a set by parcel post if your dealer cannot supply you.

Send for circular.

No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

Sole Manf's

C. E. JENNINGS & CO., 71-73 Murray St., New York


23 22 21 20 19
LENGTH OF COMMON RAFTER PER FOOT RUN
OF HIP OR VALLEY RAFTER PER FOOT RUN
DIFFERENCE IN LENGTH OF JACKS 16 INCHES CENTERS
2 FEET
FIGURES GIVING SIDE CUT OF JACKS
OF HIP OR VALLEY RAFTERS
CUT OF SHEATHING IN VALLEY OR HIP
22 21 20 19 18 17

Every Carpenter Knows the Ordinary Lengths and Cuts of Rafters. It's the Odd Ones He Cannot Remember.

Our rule not only gives the lengths and cuts of rafters to frame the seven ordinary pitches of roof but gives the lengths and cuts of rafters for SEVENTEEN DIFFERENT PITCHES OF ROOF.

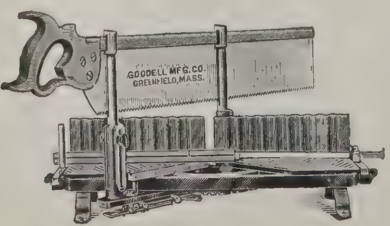
Send for our little Book explaining this rule. It's free.

NICHOLLS MFG. CO. **Ottumwa, Iowa**

Goodell Mitre Box

Made of STEEL—Cannot Break

For years this Box has been recognized as being *first in quality and improvements,* and the new STEEL BOTTOM PLATES with ANGULAR SERRATURES to prevent the work from slipping add still more to its convenience and attractiveness.


GOODELL MFG. CO.
GREENFIELD, MASS.

Write for new *Circular K* describing this and many other features.

GOODELL MFG. CO.

Greenfield, Mass.

town, N. Y., is contained in a 44-page catalogue which is being distributed among the trade. Special attention is called to the makers "XX hand edge taper files," which are made from the highest grade of steel and produced on machines operated by practical file makers. Special stress is laid upon the durability of these files and to the satisfaction which they give wherever introduced. The greater portion of the catalogue is devoted to the various lines of saws turned out by Moore Brothers, who have had 46 years' experience as saw and file makers. In connection with the various illustrations is brief descriptive matter, together with sizes, prices, etc. Not the least interesting feature of the catalogue are the testimonial letters from some of the many who have handled and used saws and files of this concern, the list representing a wide range of territory.

TRADE NOTES

The Wausau Abrasive Company, Wausau, Wis., has been organized and incorporated for the manufacture of abrasives, papers and cloths. The new company has purchased the plant, equipment and real estate, trade marks, etc., of the Wausau Sandpaper Company of Wausau, Wis. P. W. Sawyer, formerly general manager of the old company, heads the new company as president and general manager. The other officers are Charles B. Osen, vice-president, formerly sales manager; J. K. Sawyer, treasurer, and R. E. Chartier, secretary. The new company started operations June 15.

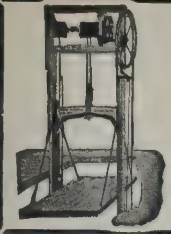
Milburn Acetylene Gas Machines for use in furnishing light for country homes are the subject matter of an attractive catalogue issued by the Alexander Milburn Company, 1420 West Baltimore street, Baltimore, Md. There are two general types of Milburn house lighting machines, one of which is intended for all installations from the average home up to any large number of lights, while the other is a small machine especially built to extend the advantages of gas lighting to very small homes that require only a few lights. The machines are illustrated in a way to render their construction readily understood while the descriptive particulars set forth the advantages claimed for the apparatus in a way to command attention.

R. J. Schwab & Sons Company, Milwaukee, Wis., is distributing an illustrated folder printed in colors relating to its Gilt Edge furnaces. These warm air furnaces have been on the market for many years and have demonstrated their merits feature by feature. The radiating surfaces are large, the fire travel is long and the combustion chamber is of ample size. The fire pot is made in two pieces, thus avoiding cracking, which is likely to happen in the "one-piece" fire pot construction and as special attention is given to all joints leakage of smoke, gas or dust into the air chamber or in the basement is prevented. The company will send an illustrated descriptive catalogue to contracting builders who may be interested.

A number of reasons why Sheldon's slate should be used as a roof covering are set forth with considerable detail in an interesting folder issued by the F. C. Sheldon Slate Company, Granville, N. Y. Reference is made to the fact that Sheldon's slates are a natural rock product and are therefore exceedingly durable. The point is also made that they will not rust, decay-crack, disintegrate, melt, burn, or smolder, and that they will neither contract nor expand under influence of heat or cold. The slates are produced in natural colors —red, green, purple and black, and when desired combinations made up of the four colors can be used for the purpose of carrying out architectural color schemes or for the enhancement of artistic effects and surroundings.

"The Roof That Never Wears Out" is the title of an interesting little pamphlet sent out by the Rising & Nelson Slate Company, West Pawlet, Vt. There are comments on the life of a slate roof, mention being made of the fact that the company's Deep Big Bed slate have been on roofs nearly 50 years and are as good to-day as when first put on. Reasons are given

(*Continued on page 86*)



ELEVATORS for Many Purposes

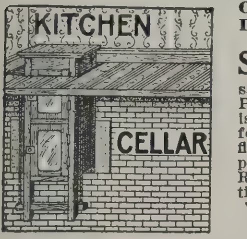
Elevate Your Business with the

"BLAKE ELEVATOR"

Hand Elevators
Belt Power Elevators
Dumbwaiters
Invalid or House Elevators

State your requirements and an interesting proposal will promptly come.

Blake Elevator Mfg. Co., Sidney, Ohio



CARPENTERS WANTED AS AGENTS During Fall and Winter Months. Big Money; Ready Seller.

Sanitary Automatic Dumbwaiter

saves carrying food to and from the cellar. Perfectly ventilated; screened openings; finished inside with durable white enamel. Keeps food perfectly. Top lies flush with kitchen floor. You can walk over it. Operates with push button or lever. Also furnished as a Refrigerated Dumb Waiter. Write for Particulars and Price.

York Automatic Dumbwaiter Works
641 W. Market St., York, Pa.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS AND DUMB WAITERS
Automatic Hatch Gates
Send for Circular

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kansas City, Mo., 717 Commerce Building
Gus Taliaferro, Oklahoma City, Okla.
Branch Offices, 136 Liberty St., N Y. 108 11th St., Omaha, Neb.

1853 BUCK BROS. 1914

BUCK BROS

Buck Brothers Tools are LASTING tools—they keep their edge.

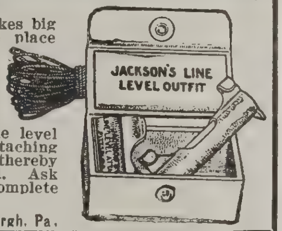
We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

BUCK BROS., Millbury, Mass.

A UNIQUE TIME SAVER

The Jackson Aluminum Line Level makes big saving of time and labor. Takes the place of the old-fashioned sixteen foot straight edge. May be carried in vest pocket. No contractor, builder, carpenter, etc., can afford to be without. Stretch line and hang the level on it—It's positively accurate. Complete outfit goes into neat leatherette case and consists of the level with 40-ft. line also spring clamp for attaching level to steel square or pocket rule, thereby serving as a plumb rule or bench level. Ask your dealer or send $1.00 for outfit complete post paid. Send for Tool Catalog.

J. Woodwell Co., Sole Agts., 200 Wood St., Pittsburgh, Pa.



DAME NATURE spent ages in making an almost indestructible paint pigment and for half a century

DIXON'S SILICA GRAPHITE PAINT

has proven itself the most durable of all protective paints for structural iron and any and all metal surfaces. Booklet No. 32-B upon request.

Made in Jersey City, N. J.
Joseph Dixon Crucible Co.
ESTABLISHED 1827

BOOKS

OUR BOOK DEPARTMENT is prepared to supply you *with any book* in print on Carpentry and Building, at the lowest possible prices. When in need of assistance in selecting the best books on *any* subject, remember we make a specialty of giving reliable information gratis. Tell us what you are interested in now or send us the list of books you intend to purchase and we will quote you promptly.

BUILDING AGE
239 West Thirty-ninth Street New York

THE IDEAL WAY TO BUILD

Use a Van Guilder Hollow Wall Concrete Machine

It builds double monolithic walls tied together and steel reinforced. Continuous air space, dry, warm, sanitary, fire proof, age proof, repair proof.

Better than brick, cheaper than wood.

Large illustrated Catalogue and Book "How to Build" free.

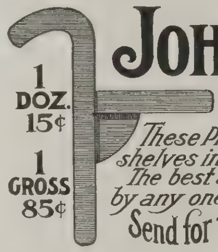
VAN GUILDER HOLLOW WALL CO.
712 Chamber of Commerce Bldg., Rochester, N. Y.

Build for An Income

Buy a PLAN BOOK of FLAT BUILDINGS and plan an income in your old age. Our book gives you ideas from TWO FAMILY FLATS to TWELVE FAMILIES and our price for plans is reasonable.

EDUCATIONAL
First Edition—Right off the Press $ .50
Also a Book for Residences...... .25
Both for .... .65

H. O. COOK & CO., 721 Ashton Bldg., Grand Rapids, Mich.

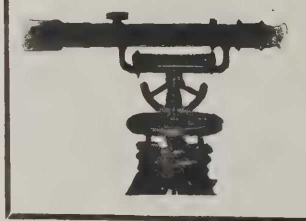


1 DOZ. 15¢
1 GROSS 85¢

JOHNSTON'S *Patent* SHELF PIN

These Pins are used for supporting movable shelves in Book Cases. Cannot fall out or sag down. The best shelf pin made. Easily put in place by any one.

Send for free sample to **J. D. JOHNSTON, NEWPORT, R. I.**



THE YANKEE
Compound Level
Just the Thing for a Builder
Accurate—Low Priced
FROST-ADAMS CO.
Cornhill, Boston
Send for our catalogue

ONLY SELF-SETTING PLANE

Sent on trial as per circular. Our $1.00 certificate if you mention this paper.

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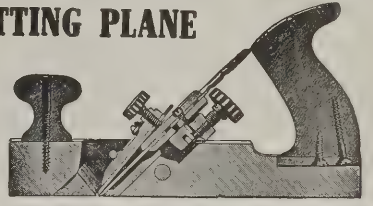

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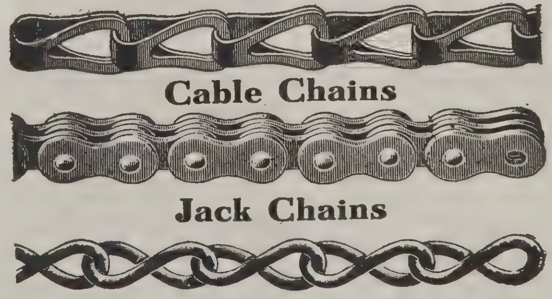

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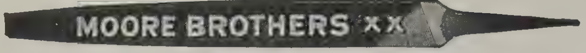

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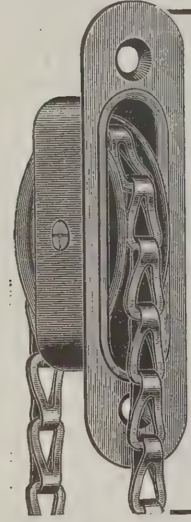

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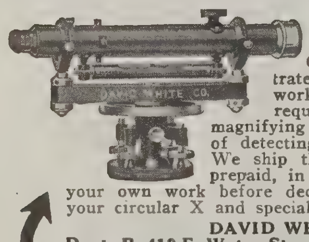

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why slate should be used instead of shingles or composition material as a roof covering and why "Deep Big Bed slate is the cheapest and best."

One of the interesting features of the July issue of the *Medusa Review*, the house organ of the Sandusky Portland Cement Company, Sandusky, Ohio, is an illustrated article dealing with garden ornaments of concrete. The issue is also well illustrated by means of halftone engravings, one showing the new Peoples Savings Bank Building at Providence, R. I.; others include residences in various parts of the country; another shows the Washington Street School at Fort Wayne, Ind.; another deals with ornamental porch work, and still another shows a sanitary cow stable and creamery at Middletown, R. I. All these buildings made use of Medusa white Portland cement supplied by the company named.

Joseph T. Ryerson & Son, Chicago, Ill., have just issued the second edition of their Technical Library No. 8 on "Concrete Reinforcing." In view of the extent to which reinforced concrete is being used at the present day this little pamphlet is of unusual interest and value to the concrete contractor. Reference is made to the capacity of the company to furnish bars either bent or straight, together with other reinforcing requirements and to deliver them on the job even before the "forms" are ready.

Margolin & Simerman, Inc., 373 Saratoga avenue, Brooklyn, N. Y., have recently been incorporated to do a general contracting and mason building business and are desirous of receiving price lists of reinforcing materials, etc.

The last issue of *Graphite*, published by the Joseph Dixon Crucible Company, Jersey City, N. J., is of more than usual interest. Naturally emphasis is laid upon the use of graphite products, but the feature is found in the halftone illustrations of the prize winners in the fourth annual 500-mile automobile race at Indianapolis on May 30. Each picture occupies nearly half of the upper part of a page and shows the driver and his mechanician seated in their car. The reason for this prominence is that Dixon's Graphite Automobile Lubricants were used on the cars in question.

Sanford E. Thompson, the well-known authority on concrete and with main offices and laboratory at Newton Highlands, Mass., makes announcement that Keppelle Hall has been added to the organization. Mr. Hall has for the past 15 years been actively engaged in engineering construction and has had wide experience in scientific methods of management.

"Co-operation in Specifying" is the title of the leading comments in the June issue of "DooR-Ways," the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill. Among the attractive half-tone illustrations is one of the largest department store in the city of Pittsburgh, and in connection with it the statement is made that there are 162 sets of R-W Ideal elevator door fixtures in use in this building. The design of the track for this form of elevator door is said to render it dust-proof. The Ideal hangers are equal to the width of the door and operate over steel balls. This long bearing uniformly distributes the weight of the door and insures that smooth, steady motion and long wearing qualities so essential in elevator doors. The assortment of hangers turned out by the company is such that there is said to be "a hanger for every man's purse." Accompanying this copy of "DooR-Ways" is an illustrated card calendar for June embellished with a bust picture of the very attractive young lady who has posed so effectively for the series of calendars regularly sent out by this concern.

TO MANUFACTURERS

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THE BUILDING AGE

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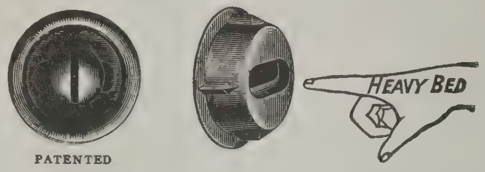

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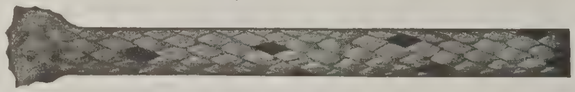

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The Building Age picks out well-built and well-designed houses for its illustrations, and they almost always find that these houses have been stained with Cabot's Stains.

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the houses that have been stained with
Cabot's Creosote Shingle Stains

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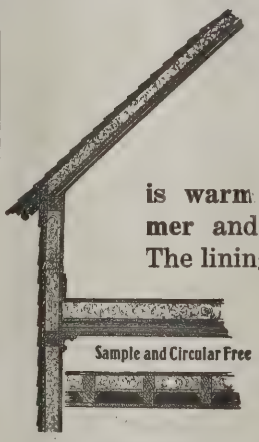

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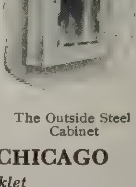

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Makers of Steel Furnaces. Free Booklet

THE BUILDING AGE

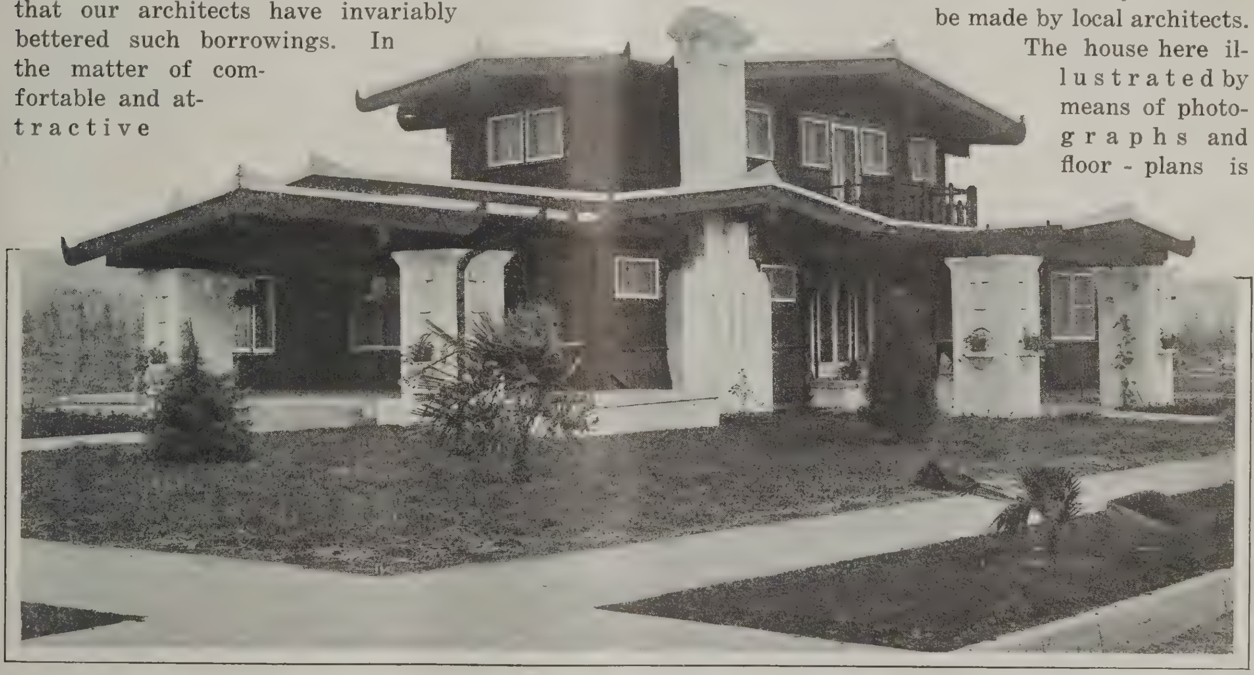
NEW YORK, SEPTEMBER, 1914

A Blending of Chalet and Bungalow

An Excellent Example of This Type of Dwelling, the Treatment Resembling the Japanese in Its Style of Architecture

By Charles Alma Byers

THE blending of architectural styles is very common in America. In fact, it has become so commonly practiced that we are often accused of possessing no styles of our very own—only adapted borrowings. The accusation, too, may, in great degree, be true, but there should, nevertheless, be considerable satisfaction in the knowledge that our architects have invariably bettered such borrowings. In the matter of comfortable and attractive homes for all classes it is an indisputable fact that the United States leads all other nations.



A Blending of Chalet and Bungalow—Home of Albert J. Rigali at Los Angeles, Cal.

Architecture, anyway, has always been in an evolutionary stage, and so long as we add a few improved modifications to the world's architecture, and thereby create desirable homes for people of every financial condition, we should be content to permit the claims of other countries for contributing the original styles.

There are two styles of attractive homes, both borrowed, which have become very popular in this country, especially on the Pacific Coast, during the past few years and these are the bungalow and Swiss chalêt. Both possess many admirable features, and it is therefore not at all strange that an attempt to blend the two styles should be made by local architects. The house here illustrated by means of photographs and floor-plans is an example of the result. The new style evolved from the combination met with instant favor, and in southern California particularly is being largely used. There are naturally many variations of it, but the house here shown is an admirable and attractive specimen.

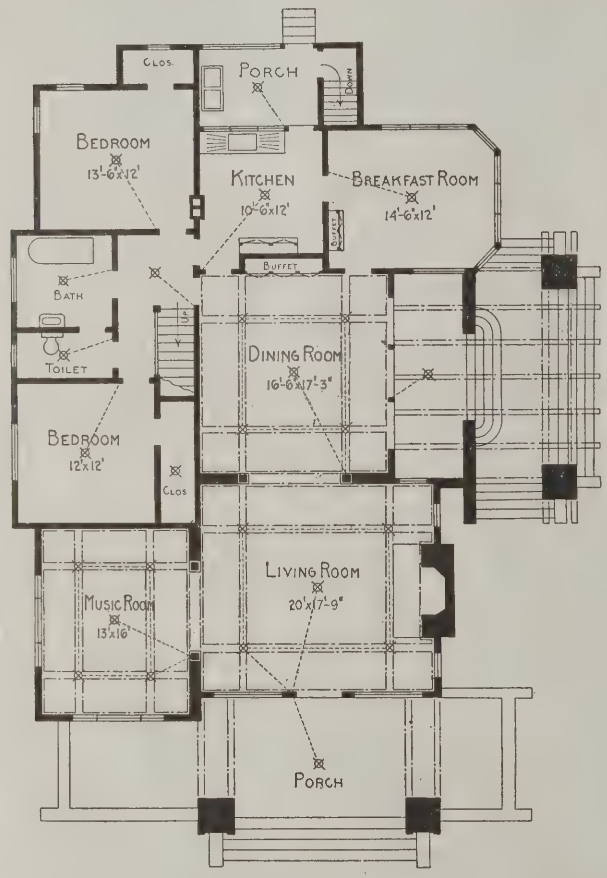
The roof of both the bungalow and the chalêt is comparatively flat, with broad projections in the eaves and gables. The one here used is of this type, varied with an upward turn of the ends of the combs and rafters, producing what is commonly termed an aeroplane roof. The house is virtually two stories high, and each story is made to apparently possess its own individual roof, somewhat resembling in this respect the Japanese style of architecture. The roofing, which is called "Silveroid," a paper composition manufactured by the Pioneer Paper Company, Los Angeles, Cal., is almost pure white.

The masonry work, consisting of the chimneys and the massive porch pillars, all of excellent design, is of cement stucco over common brick. This stucco is also nearly pure white, harmonizing with the composition roofing. The siding is of sawed redwood shakes, stained, like the finishing timbers, which are also of California redwood, a light brown color. A delicate trim of white about the windows and doors completes what is indeed a very striking color scheme.

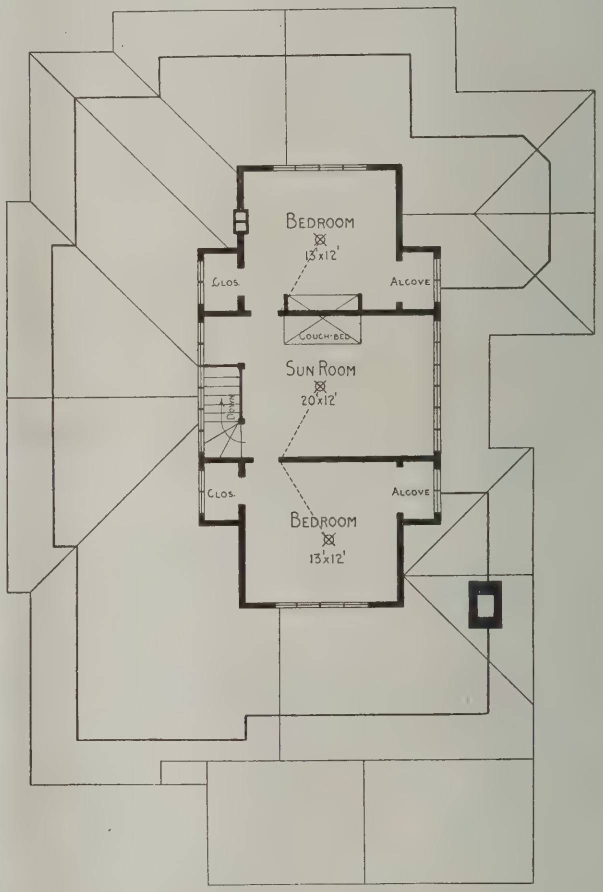
The house is designed for a corner lot and has both a front and side entrance. A broad veranda and piazza combined extends across the entire front, and the entrance here leads into the living room. A porch also covers the side entrance, and here a series of French windows and doors open into the dining room. Both porches have cement flooring and all walks are likewise of cement. Over the side entrance there is a small second floor balcony, with an interesting railing.

There is a total of ten rooms, besides the bathroom, a small hall and the small rear screen porch—all of which are on the first floor except two bedrooms and a large sun room. The floor arrangement is especially good, and the accompanying plans should be carefully studied by the prospective builder. Across the front are the living room and music room, and back of the former is the dining room. The three rooms are connected by broad open arches, hung with portieres, and all have beamed ceilings and are similarly finished and harmoniously decorated.

The woodwork, which is of Oregon pine, is stained, with Johnson's Wood Dye, a shade similar to that of fumed oak, and the floors are of polished oak. The walls of the living room and music room are papered with "grass cloth" of a bronze-brown shade. In the dining room a paneled wainscot extends to a height of about four feet six inches, capped with a plate rail, and above this point the walls, like the ceilings in all of the rooms, are tinted.



Main Floor Plan—Scale 1/16 In. to the Foot



Plan of Second Floor Showing Lines of the Two Roofs—Scale 1/16 In. to the Foot

A Blending of Chalet and Bungalow

The living room possesses a simply but artistically designed fireplace of olive green tile, at one side of which is a built-in writing desk and at the other a built-in seat. A broad built-in buffet is a feature of the dining room.

To the rear of the dining room are a breakfast room and the kitchen, the latter possessing the usual conveniences in the way of cupboards, drawers, and so forth. The breakfast room is ideally located to get the morning sunshine, and practically one-half of its wall space is devoted to casement windows. Like the principal rooms already mentioned, it has hardwood flooring, and, like the dining room, possesses a buffet, although much smaller in dimensions.

There are two bedrooms on the lower floor, each with a roomy closet, between which is located the bathroom and lavatory. A small hall provides connections, and also from the hall rises the stairway leading to the second floor.

The principal room upstairs is the sun room, the dimensions of which are 12 by 25 ft. It has windows on two opposite walls, and from one of these sides a door leads into the second floor balcony. A disappearing couch bed, which is patented and manufactured by the Holmes Disappearing Bed Company, Los Angeles, Cal., makes it possible to convert the room into a sleeping room if required. Each of the two bedrooms on this floor possesses, besides a large closet, a sort of alcove, an arrangement that is very much appreciated.

View in Dining Room Looking Toward the Built-in Buffet

The house is heated by a "Browne" hot-air furnace, made by the Phillips Heating & Ventilating Company, 1224 South Figuera Street, Los Angeles, Cal. The stirway to the basement makes its descent from the rear screened porch. Modern equipment is used throughout, and the construction work is such as to make the house warm enough and otherwise suitable for any climate.

The dwelling was designed and built by the Pacific Home Builders, Los Angeles, Cal., and represents an expenditure of $4,700. It is the Los Angeles home of Albert J. Rigali, an officer of the company named.

◆

Sand-Lime Brick in Michigan

Michigan has been the leading State in number of plants and in value of production of sand-lime brick since the beginning of the industry in this country, except in one year, 1906. Twelve plants were in operation in the State in 1913, according to the United States Geological Survey. Michigan's product in 1913 was valued at more than twice as much as that of the second State, New York, and represented over 25 per cent of the total value.

◆

A Carpenter's Kit Bag

A writer in one of the English building papers comments as follows upon the subject indicated by the above title:

"The carpenter without his tools is a lost man. In this respect he is at a disadvantage compared with other tradesmen, who, as a rule, can borrow what they require from fellow-workmen, or, in some cases, can obtain a loan of them from their employers. But the carpenter carries his 'calling in his bag' when he goes to a job, and if through any unforeseen cause or misfortune this bag or its normal contents are absent he is in a very bad way indeed. The pawnbroker's assistant, who is well posted upon all that concerns his fellow man, is well aware of this fact, and is always prepared to advance a reasonable amount on a carpenter's kit, as it is certain to be redeemed again, and not left on his hands, and the man who lives by his wits, who is also pretty well informed, turns this trait of the above pawnbroker to account by stealing carpenters' kit bags, and 'hypothecating' them.

"England, by the way, is the only country where a workman's tools are a legal pledge, and are accepted by pawnbrokers. Elsewhere it is an offence, punishable by fine or imprisonement, for a pawnbroker to advance money on the tools by which a man earns his living. But there is, of course, another side to the picture, and this is when a man is compelled to part, at any rate, temporarily with his kit to keep himself alive. 'I lived for two days on my saw,' said a man who had been through the

The Fireplace and Mantel in the Living Room

A Blending of Chalet and Bungalow

mill of misfortune, 'and one day on the hammer and chisels; the bag and the smaller tools stood me off for two days more.'

"A carpenter's kit is an open sesame to hospitality up country in Australia, and the bearer is always welcomed at any station he arrives at, for there is always work for him to do which the 'station carpenter' is not capable of doing in a satisfactory manner, for the 'station carpenter' is, be it said, that peculiar bungler at everything he touches—a Jack of all trades. Very probably he—the 'station carpenter'—got his post through the bag he carried in his hand, and the cool assurance that he also carried—hardly less conspicuously. He got the job, and as there was no one else to replace him he held it. The bag he carried over his shoulders was also make-believe; it held a couple of tools, maybe with a ragged change of underclothing below them, but it answered its purpose.

"The genuine man, who comes along with a full kit, would not settle at a station. The pay would be insufficient and the monotony uncongenial. He is on the Wallaby for reasons of his own—perhaps drink, perhaps making from one town to a new settlement, perhaps just drifting round for a spell as a change from city life. The boss does not know anything about carpentering, but he knows that a full kit means a competent man, and an agreement is soon entered into for the stranger to do what is required for a certain sum and his tucker. Then the 'station carpenter' takes second place; he acts as assistant, and probably picks up another useful hint or two.

"There is an art in carrying a full kit bag, which the carpenter at home knows nothing of, for he has no reason to put it to use; but the man who tramps twenty miles day after day in a hot sun, and over apologies for roads, soon learns it. A good deal depends on the way the bag is packed, and the addition of a shirt or two wedged in between the tools by its comfort militates against the added weight; but the most important part is the securing of the bag so that the strain is equally divided between both shoulders."

◆

Benefit of Warming Homes with Furnaces

To show prospective customers for heating equipment the advantages of the furnace for sending a continual flow of fresh warm air into their homes the manufacturers of furnaces have prepared for general distribution without reference to any particular furnace an eight-page booklet entitled "Warm Air the Best," from which the following extracts have been made:

Necessity compels the use of some adequate means of supplying artificial heat during many months of each year in the home or other buildings in which yourself and family spend a large portion of your lives. The health and comfort of the household or the users of any building depends to a serious extent on a proper arrangement for heating. Therefore, the selection of the best and most economical method for supplying this heat is a matter entitled to your first and careful consideration.

The popular demand for a permanently satisfactory and yet comparatively inexpensive heating plant has caused the development of the modern warm-air furnace, affording a thoroughly reliable and superior heating plant, which is at once healthful, economical, practical and satisfactory, with the material advantage of being obtainable at moderate cost. It is the oldest and most generally used method of heating the home and continues in favor because it has been demonstrated to be the correct solution of the problem of heating homes and moderate sized buildings for which no other system is so perfectly adapted.

Some reasons for favoring the furnace are:

It will pay for itself in the saving of fuel.

It will ventilate your rooms and make your home sanitary.

It is made in many styles and sizes and for all the different fuels.

It is recommended by physicians and heating and ventilating engineers.

It will warm the floors as well as the air in the rooms and furnish an even, steady heat.

It costs little to install and will give long service.

It is inexpensive to make the few repairs necessary and will last a lifetime with ordinary care.

It is simple and economical to operate. It requires little attention—only a few minutes a day.

It is most cleanly, sanitary and healthful and will furnish a quicker heat than other systems.

It will heat every part of your house or building with only one fire, affording an even, pleasant heat.

It saves floor and wall space in the rooms and halls and does away with a number of separate fires.

It does away with the dirt and ashes incident to stoves or open fireplaces, and there is less danger of fire.

It furnishes the greatest amount of clean air and does not cause dust to collect on the walls and ruin the decorations.

It is the only system by which proper humidity can be supplied in small or medium sized buildings, and this proper humidity—or, in other words, the correct amount of moisture in the air—is what produces a soft, balmy, pleasant temperature.

With all of these advantages naturally and positively in favor of warm-air furnace heating, it should still be borne in mind that the first cost, installation, operation and upkeep is low compared to that of other systems, and nothing is sacrificed for the sake of economy when a warm-air heating plant is used.

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Large Concrete Floor Panels

The floor panels of the Ford Motor Company's assembling plant at Portland, Ore., are said to be about the largest ever used in a floor of the mushroom type. Plans for the building were filed with the building inspector's office about a month ago and show a 3-story building, 75 x 300 ft., of reinforced concrete built on the Acme flat-slab system. The slabs are to be 27 by 28 in., 11 in. thick, with some special slabs 20 and 22 in. thick.

◆

We have just received from the trustees of the Public Library of the city of Boston a copy of the second edition of its catalogue of books relating to architecture, construction and decoration. It is a volume of 536 pages and embraces a section on City Planning.

A Young Cattle Barn with Cement Silo

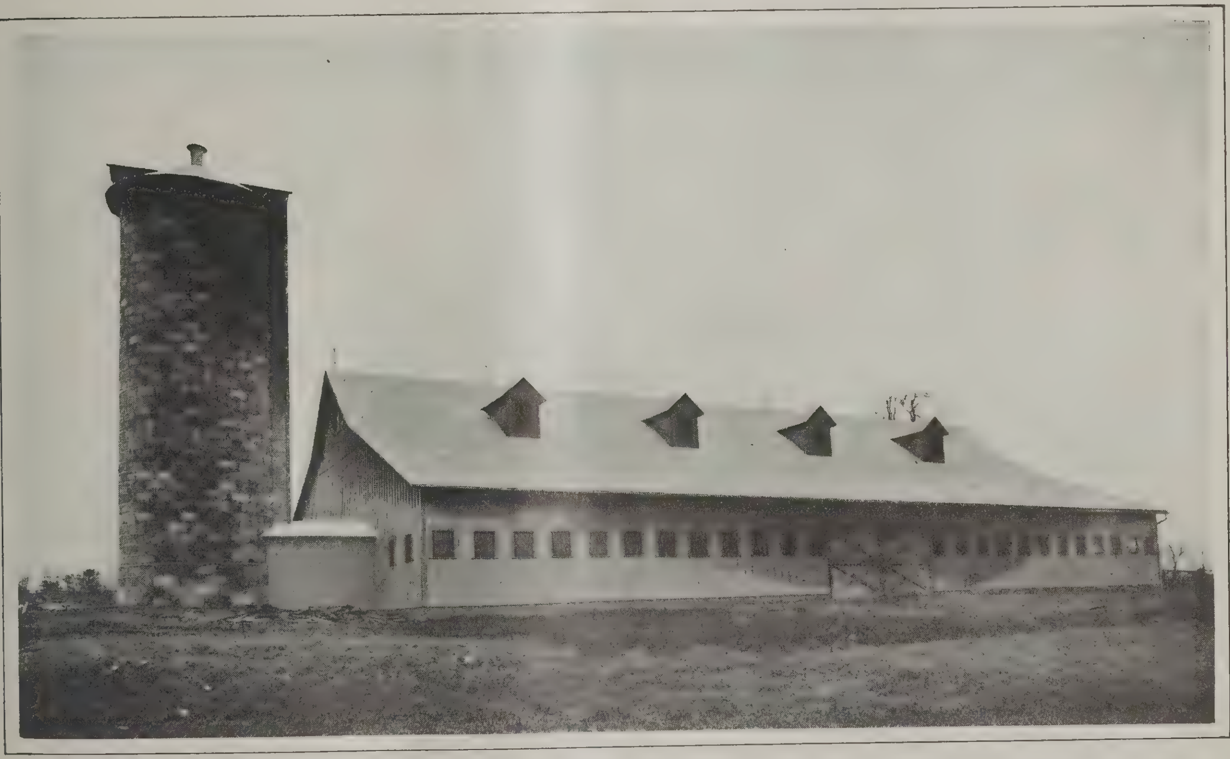
Accommodations Provided for 152 Head of Cattle —The Calf Pens a Feature—Details of Construction

MODERN barn construction and arrangement is always of interest to the builder whether the structure be intended to serve the wants of a comparatively small farm or the building be one to meet the needs of stock breeding and dairy purposes. At intervals in the past we have brought to the attention of our readers many examples of barn construction and of such varied character as to meet the requirements in different sections of the country. In the pictures appearing upon this page we show several barns located upon a large farm in the state of Ohio, but the descriptive article deals more particularly with the young cattle barn shown in the larger view at the bottom of the page.

This barn is 72 ft. wide and 112 ft. long, the arrangement of the main floor and the position of the silo at the left being clearly indicated upon the plan. We also give a vertical cross section showing the framing and the cement wall which appears at the end of the hay bay. This young cattle barn is of frame construction, the picture giving an excellent idea of the outside appearance of the building, while the cross section shows the sizes of the various framing members.

Southeast View of Milk Barn, Residence and Creamery

Northeast View of Main Milk Barn, Silo and Creamery. The Calf House is Hid by the Creamery



Photographic View of the Young Cattle and Calf Barn with Solid Concrete Block Silo Shown at the Extreme Left

A Young Cattle Barn with Cement Silo—Designed and Owned by Jacob E. White, Greenfield, Ohio

The siding on the barn is 1 x 12-in. soft pine placed vertically with 2-in. oval strips covering each joint. The material was taken from an old building which was torn down and carted to the farm. The same is true of the mortised frame work which sets on the 8-ft. cement wall.

It will be seen from an inspection of the plan and cross section that the ground floor has a 24-ft. shed on each side with stanchions facing toward the cement wall that supports the main building. Back of these stanchions next to the outside wall there are James calf pens. These pens are 48 ft. long and 7 ft. wide with a partition every 12 ft. or a pen for five calves between each column with five stanchions and a gate to each pen. The pen next to the driveway will accommodate six calves, thus making room for 42 on each side or for 84 small calves in all. The stanchions are 34 on a side or 68 in all. The total capacity of the barn is 152 head, ranging from one week to two years old. The barn is fitted with a Star Litter Carrier which runs between the pens and the gutters the full length on both sides.

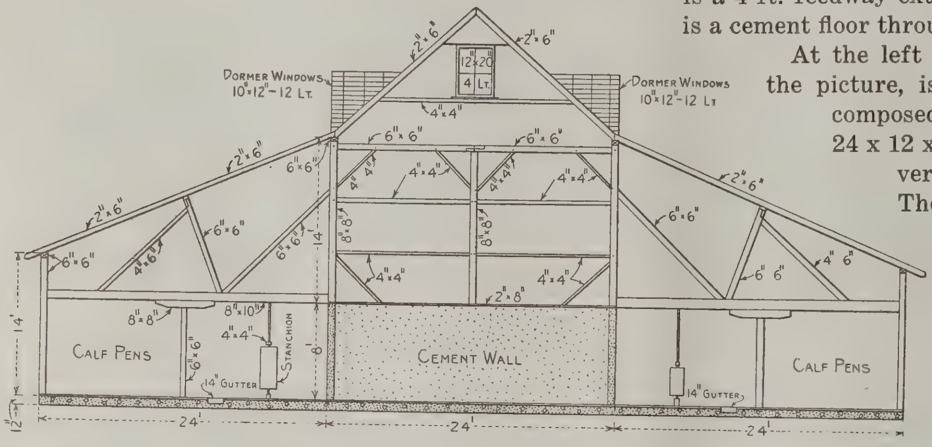
It is also fitted with Star Hay Carrier tracks, has manure pit, a 12 x 10 up-ground Perfect cement block cistern and two 10-ft. water troughs of the same material. The arrangement is such that water is also carried to the residence of the owner siuated about 1000 ft. away.

The center of the main floor is taken up with the hay bays. This space is 24 ft. wide and 22 ft. to the square with no cross beams, it being braced by the sheds on either side. This gives an unobstructed space from the floor of the hay bays to the rafters.

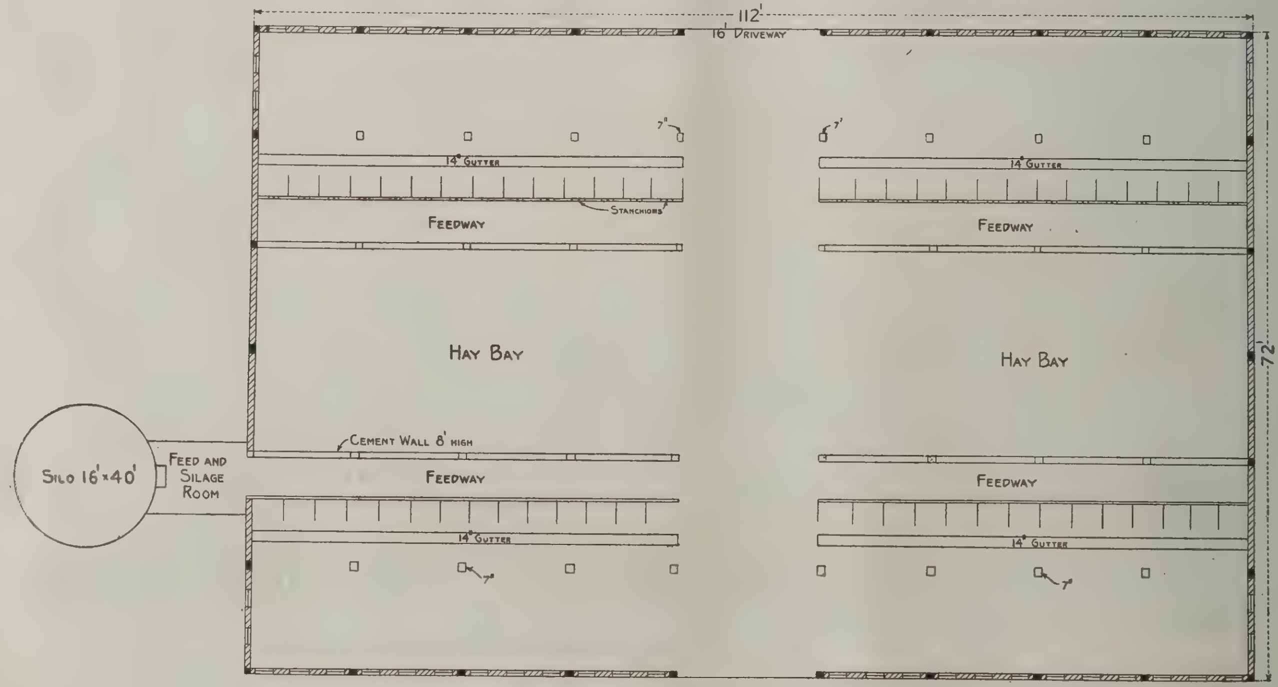
There is a 16-ft. driveway across the barn which leaves plenty of space for feed room. The cement wall extends up 8 ft. to the floor above the cattle room and there the hay mow widens out 24 ft. on either side.

The arrangement of the main floor is such that feed can be hauled in front of the cattle as there is a 4-ft. feedway extending all around. There is a cement floor throughout the whole building.

At the left of the barn, as shown in the picture, is a "Perfect" cement silo composed of solid concrete blocks 24 x 12 x 4 in., well reinforced both vertically and horizontally. The blocks were made from lake sand and the best Portland cement. The silo is 50 ft. deep and 14 ft. in diameter. It is 5 ft. below ground and 45 ft. above ground. The foundation was dug 18 in. wide and 5 ft. deep and filled with concrete and boulders, after which the dirt was thrown out and the wall plastered. The silo was treated with a cement wash and then a coat of thin gas tar was applied. It is covered with three-ply J-M Asbestos roofing, furnished by the H. W. Johns-



Vertical Cross Section, Showing the Framing and the Concrete Wall at the End of the Barn—Scale 1/16 In. to the Foot



Plan of Barn and Silo, Showing the Arrangements for Cattle and Hay with 16-Ft. Driveway Across the Center—Scale 3/64 In. to the Foot

A Young Cattle Barn with Cement Silo at Greenfield, Ohio. Designed and Owned by Jacob E. White

Manville Company, Pittsburgh, Pa. The roof is white and makes a very attractive appearance. The roof of the young cattle barn, of which there are 11,100 sq. ft. of area, is also covered with the same material. The cement blocks were made by the Perfect Cement Silo & Cistern Block Company, Delaware, Ohio.

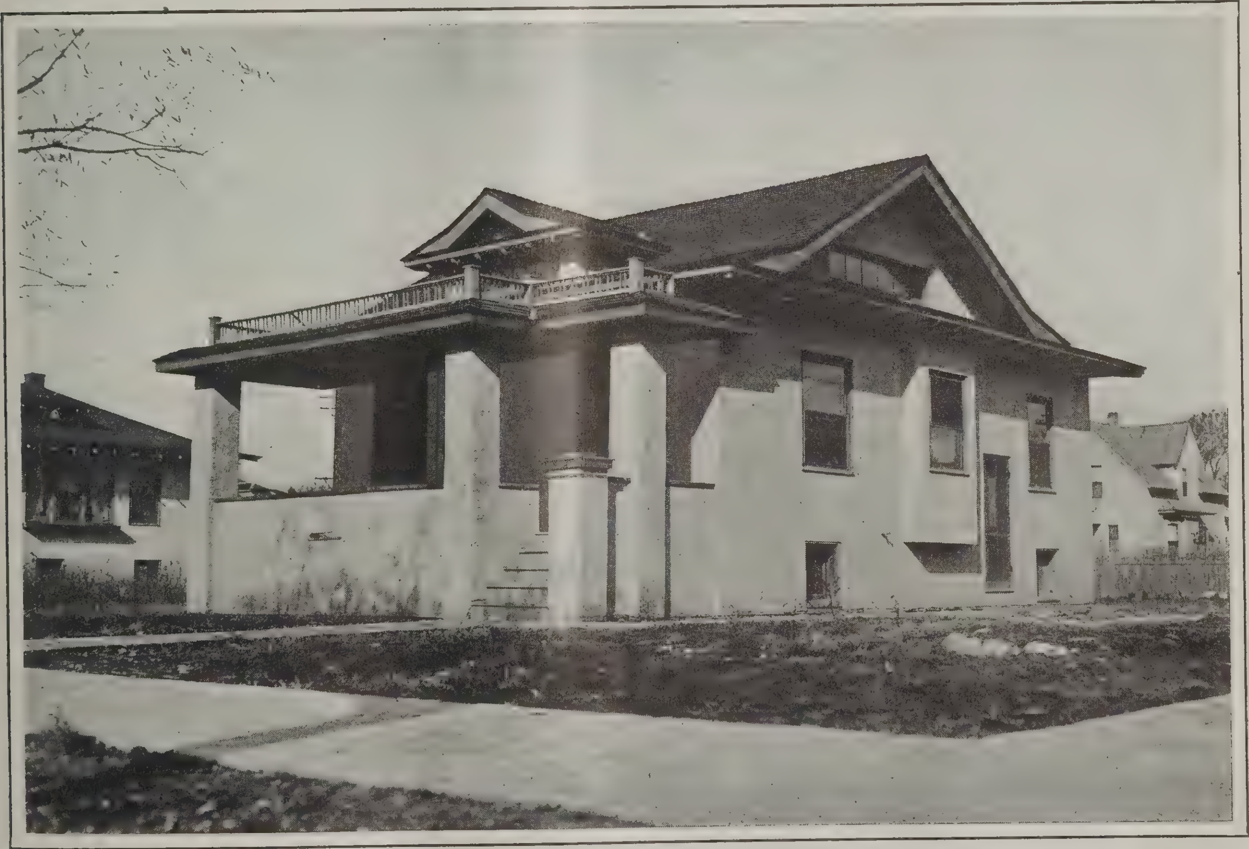
One of the smaller pictures upon the first page of this article represents a view of the milk barn, the creamery and the residence of the owner, while the other small picture gives another view of the main milk barn, the silos and the creamery. The calf house or barn is hid by the creamery at the left in the picture. This milk barn is 44 x 200 ft. in size and it as well as the other barns are ventilated in the most approved style. In the portion of the milk barn shown in the small picture to the right of the silos is room for ten horses. In this barn the owner also stables 105 registered Jersey cows.

These barns are located on Spring Grove Jersey Farm, consisting of 225 acres, at Greenfield, Ohio. The buildings were designed by the owner, Jacob E. White, and the work was executed by W. W. Everhart, of Greenfield, Ohio. Mr. White states that the main cow barn is an old structure with additions built on either end, while the young cattle barn was built largely of material taken from an old structure that the owner purchased, tore down and moved to the farm. The farm is regarded as one of the most practical dairy outfits in the state and is visited each spring by the students in the dairy class of the Ohio State University.

A Low Cost Cottage for the Suburbs

An Exterior of Stucco Which Contrasts with a Shingled Roof of Moss Green—Details of Construction—Cost $3,200

THE subject of the present article is one of a large number of architecturally attractive suburban cottages of moderate cost that have been erected recently in Chicago Lawn, one of the many pretty and growing suburbs of which the city of Chicago can boast. The house in question has for its architectural features an attractive balcony and a stucco exterior, harmonizing well with its green shingled roof. Its interior features include an undivided living and dining room, while all remaining rooms are easily accessible from a small hallway. The house is neat and quite compact, and affords an interesting illustration of what can be built in the Middle West at a cost of about $3,000, which was the outlay in round figures for the structure here shown.



A Low Cost Cottage for the Suburbs—Architect, W. D. Shoupe, Chicago, Ill.

The combination living and dining room is 14 x 24 ft. in size and has two columns, so disposed as to give the suggestion of a cut-off. A three-section buffet or china closet occupies the northeast corner of the dining room adjacent to a doorway which leads directly to the kitchen. The living room communicates directly with the hall from which all other rooms are readily accessible.

The space occupied by the two bedrooms measures practically the same as that required for the living and dining rooms. Thus the house is almost equally divided, with the intervening space taken up by the kitchen and bath room. The bedrooms measure 10 x 12 ft. and 10 x 10 ft., respectively, each containing a spacious clothes closet—that in the smaller room being well lighted by a large window.

A Low Cost Bungalow for the Suburbs—A Direct View from the Street

The kitchen is 6 x 15 ft. in size and is well lighted by a window which takes up the whole of its exposed side. Access to the basement is possible directly from the kitchen and halfway down the stairway is space for the ice box. The latter can easily be supplied with ice from the side door adjoining.

The bath room is 6 ft. square and fitted with standard fixtures. It has a medicine cabinet directly above the lavatory and the necessary artificial lighting fixtures.

There is no stairway leading to the attic, but a trapdoor in the ceiling near the far bedroom gives access to this upper section.

Each of the principal rooms is lighted by two large, double-hung windows. The house has been wired for electric lighting, and clusters of fixtures have been installed and distributed to advantage.

The building has foundations of concrete, composed of a mixture of one part Portland cement, three parts sharp torpedo sand and five parts of crushed stone, well mixed and applied. The footings measure 20 in. in width and 8 in. thick, the walls being 10 in. wide and 4 ft. high. The cellar floor is also of concrete, the proportions being those stated above.

For the framing hemlock is used throughout. The sheathing boards are of 8 in. hemlock, over which is placed a layer of Slater's building felt. The wall plates measure 2 x 4 in.

All floors are double and the finish is 2 in. face oak. The trim throughout is of oak, with two-panel doors to match. The doors inside and out are 1¾ in. thick, waxed and finished with a polish. The hardware is of a dull bronze. The windows are 1⅜ in. thick, of white pine, and double hung.

The girders are 6 x 8 in., the rafters 2 x 4 in., floor joists 2 x 8 in., and inside studs, 2 x 4 in., placed 16 in. on centers. White cedar shingles are used for the roofing, and are laid with an exposure of 4½ in. to the weather. The use of roofing paper was dispensed with, and the shingles were dipped in Cabot's creosote stain and brush-stained one coat.

The exterior walls are of stucco, on 1 in. white pine. "Medusa" compound, manufactured by the Sandusky Portland Cement Co., Sandusky, O., was used in the "dash-coat" for waterproofing.

The basement extends under most of the building and a spacious fruit cellar has been included in the plan.

The building is heated by a No. 240 "Robinson" tubular furnace, made by the Robinson Furnace Co., Chicago, Ill. Hot water coils have been installed in the furnace and connections to an adjoining tank have been made for the hot water supply. Each room has a warm air register with which the heat pipes connect. A two-section laundry tray of the granitoid type completes the equipment in the basement.

This cottage was erected at a cost of $3,200 by W. D. Shoupe, 64th place and Spaulding street, Chicago, Ill., from plans prepared by him, and the entire work was carried out under his personal supervision.

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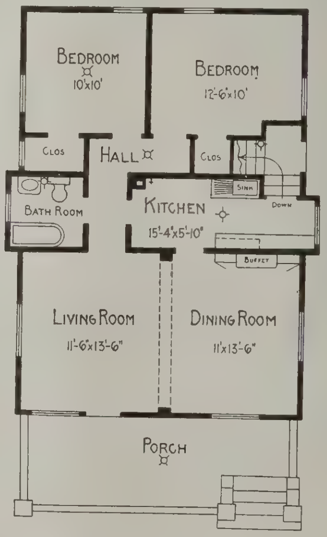
Eliminating Stairways as Fire Escapes

In discussing the best means of emptying a loft or factory building of its occupants in time of fire or panic H. F. J. Porter, expert on safety from fire and known as the father of the fire drill, points out a method for solving the escape from a crowded building.

This method is a fire wall so arranged on a building as practically to bisect it. This wall must be continuous from cellar to roof and be provided with doorways on each floor, closed by automatic fire doors. The building must be designed with two sets of egress facilities of ample proportions, one set located on each side of the wall accessible from



Main Floor Plan—Scale 1/16 In. to the Foot each floor. No fire is at all likely to occur on both sides of this fire wall simultaneously, unless it is of incendiary origin. Should a fire occur the alarm sounds and the occupants of the building on the side where the fire is merely have to pass through the doorways in the fire wall, close the doors after them and be perfectly safe. A fire drill will empty either side of a building so equipped, no matter how many stories high, in a minute. The refugees remain in the safe side of the building until the fire has been put out or they may at any time without haste use the egress facilities provided there, which would be free from smoke or fire.

"Until this standard of escape from fire is universally enforced by law," says Mr. Porter, "there will be no intelligent solution of the fire problem anywhere. The only alternative for occupants of factory buildings in which a fire occurs is either to burn to death or jump, under present conditions.

"How much better then it would be in the first instance before buildings are erected so to plan them that they will be emptiable in three minutes, beyond which time it is not safe for occupants to remain in a burning building, and to ascertain this fact by using the exit test. If any building failed to meet this test its owners should refuse to accept it from the architect and building contractor.

"To solve this problem, then, I advocate universal legislation requiring that architects and builders be prohibited from designing and erecting buildings which cannot be emptied within three minutes after a given signal; that the municipal authorities be required to institute an exit test in each building as soon as it is completed to determine if its proposed number of occupants can reach safety either through a fire wall or by stairs to the ground in three minutes and that if the building cannot pass this test, the proposed number of occupants should be peremptorily reduced until it could be altered so as to pass the test and that the proper authorities afterward be required to repeat the exit test from time to time to see that the safe conditions originally established are maintained."

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Who Pays the Quantity Surveyors?

The following interesting comments on a subject which is attracting considerable attention just at the present time were contributed to a recent issue of *Construction News* by Ernest McCullough, consulting engineer and a licensed architect under the laws of the state of Illinois.

A Low Cost Cottage for the Suburbs—A Corner of the Dining Room as Viewed From the Living Room—The Door at the Left Leads to the Kitchen

For twenty-five years George Alexander Wright, an architect of San Francisco, Cal., a former quantity surveyor in Great Britain, has been agitating the quantity surveying method for estimating buildings in the United States. A year or so ago he started a monthly publication called the *Quantity Surveyor* and organized the American Institute of Quantity Surveyors. These steps, followed by a trip around the country, on which trip he addressed a number of architects and contractors' associations, made the subject a live one in the United States and there is now a possibility that quantity surveying will be a standard method of estimating.

The question continually asked the writer since he associated with him Thomas Robinson, late a quantity surveyor in London, England, is, "Who pays for the quantities?" There is present in the mind of the average contractor an idea that he will have to pay for quantities whether he gets a contract or not, and the cost of a bill of quantities may be higher than he would pay an estimator.

The Owner Pays for the Lists

The owner pays for the lists of quantities. The first step is for the architect to decline to accept bids from contractors who have not lists of quantities prepared by some certified quantity surveyor. Thus the architect is saved considerable expense for blue printing and by having one competent person go carefully over the plans and details for the quantities before bids are called for, is apt to discover small errors which under the present method are concealed by the individual estimators, who hope thereby to run in a bill for "extras" later in the game. The quantity surveyor generally prepares the specifications for the work, thereby relieving architects of a disagreeable duty.

The lists furnished by the selected quantity surveyor are given to all the bidders whom the architect has selected, a copy being filed in the vault of the architect and there kept until the contract is completed. The contractors pay nothing for these lists, but each one adds 2½ per cent. to his bid to cover the cost of the list in case he gets the contract. By this way of bidding the successful bidder pays for the work of the quantity surveyor and as he added the item in his lump sum bid, it finally comes on the owner, as all estimating expense must.

Great Economy of the System

When the quantity surveyor system is firmly established in the United States it will cut the estimating cost for contractors out altogether. It will reduce the cost of blue printing and specification writing in architects' offices and go farther toward wiping out the "extras" bills than any one thing yet proposed. Under the present method every contractor employs a force of estimators. This means considerable expense each week and as a number of men must look over plans sent out by architects few estimators get all the time they really require for the making of a correct estimate. There is thus a tremendous economic loss. On one piece of concrete work the writer estimated for a certain firm, two other firms sent him the same plans a day or two later. These firms were so crowded that their own estimators had no time to do the work. The writer charged the full rate to each man, so he really was paid three times for the job. Under the present method of working it was not wise for him to let any one of the firms know that he had given the quantities previously to other firms. Thus each firm got exactly the same quantities and if there was any difference in the bids it would be due to the unit prices assumed by the bidders. The cost for estimating for each firm was $50, making a total cost of $150 on one item only in the building. It is to be assumed that several trades did the same thing, so the aggregate cost for the estimating on the building was not far from $1,000; all paid by the bidders.

Under the quantity surveying method for doing business the architect would have sent the plans to a quantity surveyor to take off the quantities for all the trades and also prepare the specifications. The total cost would have been less than $200 and any contractor wishing to bid could have secured a list of quantities for his own work, free of charge. General contractors would have received a complete list of quantities free of charge. The successful contractor would pay it for the owner, who would finally pay in the weekly or monthly estimates given to the contractor. When this especial feature of the quantity surveying method of estimating becomes generally known there should be a good chance for it to become firmly established in the United States.

Accidents from Poor Shop Lighting

An analysis of accidents recorded under the British workmen's compensation system shows that something like 25 per cent. of the total may be attributed to insufficient lighting of industrial works. The subject is one for very careful consideration. While the total candle-power of lamps in a room may be quite large enough, the illumination may not be well distributed. Special attention should be given the thoroughfares, the experts assert. A place of particular danger is the area just within a building which the workman enters from the glare of vivid sunlight. If the lighting is not adequate the eyes are blinded until they can adjust themselves to the new condition, and the chance of injury by machinery or otherwise is correspondingly increased. One great works has had a committee studying the lighting problem for two years. Many important lessons have been learned, and radical changes have been made in the location of lamps. The desired freedom from obscure places may be obtained usually without a greatly increased cost for illuminant.

Ventilation and Acoustics

When a sound passes into air of a different density, part of it is reflected back toward its source and the rest turned in a different direction from that toward which it was originally headed, says *The Pittsburgh Post.* The result is that if a sound encounters many such changes of density in its course it may be as seriously weakened as if a wall of glass intervened. Recent experiments show that these facts explain who so many halls are hard to hear in.

In many theaters the air, particularly when the principal source of ventilation is near the footlights, forms a sort of curtain between the stage and the auditorium, and makes it very difficult to hear what the actors are saying. A slight motion of the air often has a good effect on a hall's hearing qualities and a nearly ideal condition is approached when there is a current flowing from the stage to the auditorium, carrying the voices of the actors with it.

The acoustics of a hall are poorest when it contains several layers of air of different temperatures and densities, for at each layer sounds are reflected and refracted in a way that weakens their power or causes confusing echoes.

Design of Beams, Girders and Trusses

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C. E.*

To determine bending moments on beams on two, or more supports, it is necessary to find first the amount of the reactions.

In Fig. 8 a concentrated load is carried on a beam resting freely on two supports. For convenience we adopt the conventional method of beginning at the left end as in reading. The word conventional has the same root form as the word convenience so may be easily remembered.

Common sense assures us that if the load is in the middle one-half will be carried by each support. Let us imagine the concentrated load to be stationary and the ends of the beam pushed up by the reactions. The reactions being equal to the load there is no movement but the forces actually exist.

Each reaction being one-half of P then $R_1 = \frac{P}{2}$ and $R_2 = \frac{P}{2}$. This gives two cantilever beams with moments acting about (around) the load, with a lever arm $= \frac{L}{2}$. The bending moment under the load (middle of span) is

$$M = \frac{P}{2} \times \frac{L}{2} = \frac{PL}{4}$$

The reader is not to forget that in computing reactions, which take into account only the weight, we use the clear span (S), but in computing the moment we use the length (L) from the center of bearing on the support.

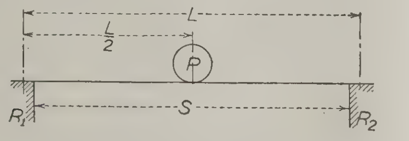

Fig. 8—Concentrated Load at Mid-Span with Beam on Two Supports

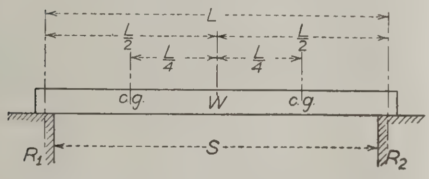

Fig. 9—Uniform Load on Beam Resting on Two Supports

In Fig. 9 a uniform load (represented by the weight of the beam) is carried on two supports on which it rests freely.

Each reaction $= \frac{W}{2}$, in which $W = wS$.

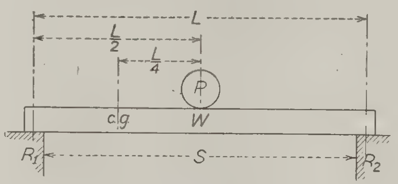

Fig. 10—Concentrated Center Load and Uniform Load on Beam Resting on Two Supports

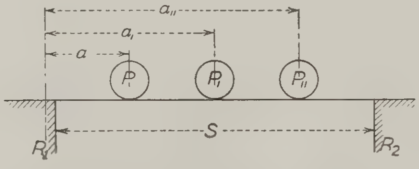

Fig. 11—Several Concentrated Loads on Beam Having Two Supports

Design of Beams, Girders and Trusses

This gives two cantilevers with moments acting about the center of gravity of the beam, which being in the middle of the space makes the length of the moment arms $= \frac{L}{4}$. The bending moment is

$$M = \frac{W}{2} \times \frac{L}{4} = \frac{WL}{8}, \text{ or } \frac{wSL}{8}$$

The reader will notice that the multiplication sign ($\times$) is not used between letters, for when several letters are written together in formulas it means they are to be multiplied together. If the multiplication sign were used it might be mistaken for the letter x when written. The multiplication sign is always used between figures. Thus, WL stands for $W \times L$, but 67 means sixty-seven and does not mean $+ 6 \times 7 = 42$.

In Fig. 10 a concentrated load is assumed to be at the middle of an opening spanned by a beam of uniform weight. The reactions are as follows

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Note—In this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 34 of the August issue.

$R_1 = R_2 = \frac{P}{2} + \frac{W}{2} = \frac{P+W}{2}$. The bending moment is

$$M = \frac{PL}{4} + \frac{WL}{8}$$

In Fig. 11 several concentrated loads are shown on a span and the reactions are to be found.

Commence at the left end take moments about R_1. Thus the bending moment at the left support is

$$M = Pa + P_,a_, + P_{,,}a_{,,}$$

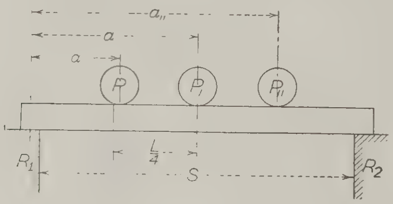
This moment will have a tendency to carry the far end of the beam, at R_2, downward unless a supporting force is exerted to hold it in position.

Here the principle of moments is again applied. The moment of a force is equal to the force multiplied by the distance, or arm, through which it acts so it is necessary to have at R_2 an upward moment equal to the downward moment. This is obtained by dividing the downward moment by the span length.

$$R_2 = \frac{Pa + P_,a_, + P_{,,}a_{,,}}{S}$$

$$R_1 = (\text{Sum of the loads}) - R_2$$

This is proved when we consider that the sum of the reactions is equal to the total load. The amount of each reaction may be checked by taking moments from the right end instead of the left and working as before.



Design of Beams, Girders and Trusses—Fig. 12.—Uniform Load and Several Concentrated Loads on Beam Having Two Supports

Example. Let $a = 3$ feet and $P = 200$ lbs.

$a_, = 7$ " " $P_, = 300$ "

$a_{,,} = 11$ " " $P_{,,} = 250$ "

750 = total load.

Span = 15 feet.

$$R_2 = \frac{(3 \times 200) + (7 \times 300) + (11 \times 250)}{15} = 363.33 \text{ lbs.}$$

$R_1 = 750 - 363.33 = 386.67$ lbs.

Checking by taking moments about the right end.

$$R_1 = \frac{(4 \times 250) + (8 \times 300) + (12 \times 200)}{15} = 386.67$$

$R_2 = 750 - 386.67 = 363.33$ lbs.

The same results may be obtained by common proportion, but upon examination the method by moments is seen to be exactly the same thing, but with less work. If the reactions were found by the common school arithmetical process of proportion the work would be longer and mistakes more apt to occur. The method of moments is the shortest and neatest way of working.

In Fig. 12 three concentrated loads are shown on a beam in which the weight is uniformly distributed. First find the reactions due to the concentrated loads. Then add to each reaction half the weight of the uniformly distributed load.

Example.—Assume a beam having a weight of 50 lbs. per lineal foot on a 15-ft. span, carrying the concentrated loads given in the last example. What are the reactions?

Answer.—Weight of beam = 15 × 50 = 750 lbs.

The reaction at each end $= \frac{750}{2} = 375$ lbs.

$R_1 = 386.67 + 375 = 761.67$ lbs.

$R_2 = 363.33 + 375 = 738.33$ "

Total load 1500.00 "

When the bending moment is wanted at any section of a beam we assume the beam at the section to be supported at the section and moments are taken about it as if it were a cantilever beam. The reaction is an upward force creating an upward moment and the loads are downward forces creating a downward moment. The difference between the moments in opposite directions is the bending moment at the chosen section. When a beam is freely supported this is always a positive (downward) moment, the beam being in tension on the lower side and in compression on the upper side. Several examples will be given in the next issue.

(*To be continued.*)

Houses Constructed of Porcelain

Some interesting particulars have just come to hand regarding a home of porcelain which can be erected in a few hours with a screw driver and wrench. It is the plan of W. H. Turner of England, who calls himself "the pioneer of porcelain" and furnishes the following details:

"In the construction of the porcelain house there is a complete absence of all absorbent materials, such as brick and mortar, plaster, whitewash, concrete, woodwork and paper. The complete porcelain house is constructed as follows: Framework, preferably of light, rust-proof metal. In this framework are fitted the huge porcelain panels, half an inch thick, 6 feet long and 3 feet wide, weighing 5 pounds to the superficial foot, decorated and glazed on both sides to resist wind, storm and weather, with steam-tight joints, made of copper-coated asbestos tape.

"Porcelain is non-absorbent, insect and germ proof, fireproof and washable, and it makes possible for all a perfectly hygienic home. As for warmth—an inch-thick wall of pure porcelain glazed on both sides is better able to keep out cold than an eighteen-inch brick wall. With bricks and mortar it takes months to erect a house of, say, five rooms; a porcelain house of the same size can be put up in a few hours."

What Constitutes a Modern Kitchen

English and American Kitchens Contrasted—A Description of a Model Kitchen—Its Location, Finish and Equipment

THERE is a growing and altogether proper tendency to treat the kitchen as an integral part of the house, which was almost entirely absent in English and American houses of earlier times; in fact, until within the last twenty-five years very little notice was attached to it. A century ago it was regarded advisable to have the kitchen occupy a separate building somewhat removed from the main building, or located at a great distance from the dining or living rooms, ofttimes the whole length of the house. The principal reason for this was the primitive methods used in cooking and preparing foods, which were very objectionable at close range. Odors, noises and unsanitary appliances made the kitchen a place to be abhorred and to be kept as far away as possible. The present-day intelligent methods of dealing with the kitchen, particularly in America, have effected a complete transformation in this old idea, says J. F. Miller in an exchange. Our modern successful architect of the home attaches great importance to the planning of the kitchen, with its adjoining pantries, closets, storage rooms, etc.; and rightfully he should, as it goes more towards making for the convenience, help and comfort of the up-to-date household than possibly any other feature of the home.

The Modern English Kitchen

The modern English kitchen, with its relation to the dining room, is interesting for comparison with those here in America, chiefly because the early English settlers constitute the original source from which we obtain our start in house building. The English kitchen's adjuncts practically comprise separate departments, such as the scullery, larder, wood, ashes, knives and boots, fuel, etc. This condition naturally requires the employment of considerable help, even in the smaller houses. On the other hand, the compactness so noticeable in American homes—requiring perhaps one-half the space, thus reducing the necessary help to a minimum and obtaining the maximum of convenience—has brought our kitchen to a standard, nearly, if not entirely, approaching the ideal. The American architect has based his idea for this compactness upon the same reasoning as is exercised in fitting up a convenient workshop, for truly a kitchen is the workshop of the house. Again, the peculiar custom of medieval times in placing the kitchen a considerable distance from the dining room still survives in the English homes, while in American homes a marked difference has long prevailed. The kitchen here is usually placed as near as possible to the dining room, only separated, if at all, by a china-closet, pantry, or butler's room.

While there may be differences as to minor details, the main features to be obtained in establishing a modern kitchen may be found in the various suggestions herein contained:-

First.—The kitchen should be roomy but not excessively large. This applies to any size of house, as too large a kitchen is maintained at the expense of convenience and labor. An ideal size for a kitchen in a house measuring 25 x 50 containing living-room, reception room, dining room and pantry on first floor) would be 12 x 15 feet.

Second.—The general construction of the interior is of the utmost importance. The floor may be of hard Georgia pine, oiled, or covered with linoleum or oil-cloth. As a covering, linoleum of a good inlaid pattern, while more expensive than oil-cloth, proves the best and most economical in length of service. In a house where comfort is demanded regardless of cost, an interlocking rubber tiling is suggested. This flooring absolutely avoids noises and is also comfortable to the feet, as well as being of an exceptional durability. Other floors of an unmerited character are unglazed tile, brick, or one of the many patented compositions consisting chiefly of cement, which is also fireproof.

The Wainscoting

The wainscoting, if adopted for the kitchen, can be of tile, enameled brick, or matched and V-pointed boards, varnished or painted; but in any event should be connected with the floor in a manner to avoid cracks for collecting dust or dirt. This is accomplished (when a wooden wainscot is used) by means of a plain rounded molding which is set in the right angle formed by the junction of the floor with the wainscot. While seldom seen, because of the expense, a kitchen completely tiled or bricked on walls, floor and ceiling is indeed a thing of beauty and necessarily an ideally sanitary room.

The doors, window frames, dressers and other necessary woodwork should be plain, made of medium wood and painted some light color or enameled white; or finished in the natural state with a transparent varnish.

The walls and ceiling, if not tiled or bricked, should be finished with a hard, smooth plaster and painted three or four coats of some light color—light yellow, green or blue making a very agreeable color to the eye. This manner of treatment permits the walls to be washed and kept free from dust and dirt, which latter is a disagreeable feature in the use of wall papers.

Third.—The proper installation of the various furnishings of the kitchen is worthy of much thought and consideration. Of all these, nothing is of more vital importance nor appeals more strongly to the household than the range. The size of the range is largely governed by the size of the house or the number of persons it is intended to serve. However, it is advisable to have a range not less than three feet square for a seven or eight-room house. It should be of a thoroughly modern style, with a hood over it, either built in or of sheet iron, an excellent provision for drawing away the steam and fumes of cooking. And, by all means, the range should be placed so that direct daylight falls upon it. Most present-day houses also have either gas or electric ranges installed in them, and these should be near the coal range so as to confine all cooking to one part of the kitchen, and further, especially in winter when large gatherings are entertained, they furnish a combined service. Some large establishments, in addition to the range, are especially equipped with "warmers."

Position of Sink

The sink, being so closely allied in its usefulness to the range, should be placed near the latter and under, between or near windows, but never where the person using it would have his back to the light. It may be of galvanized iron, copper, soapstone or enameled porcelain, and provided with an ample draining board; two being much preferred. If there is a special sink for vegetables required, it should be immediately joining draining board to insure compactness and convenience as well as economy in plumbing. The draining board may be of hardwood or of wood covered with copper or zinc. The best are made of enamelware similar to the sinks. Draining boards of copper or zinc should be given only a slight slope to prevent the possibility of dishes slipping therefrom.

The refrigerator should be built in or placed against an outside wall in order that the ice can be put in easily from without through either a small opening or window. If it can be avoided, the refrigerator should not be placed in the kitchen, but rather in the entry, pantry or enclosed porch.

The kitchen of the small house which sometimes has no communicating pantry, should have built therein dressers of such proportions as will accommodate all the necessary dishes, pots, vessels, bins for flour, sugar, etc., cutlery, and other things essential for obtaining the best results under the circumstances. A dresser of commodious size is always a blessing. The top portion, of plain shelves, should be enclosed either with doors or sliding glass fronts; the lower portion, first lined with zinc and enclosed with solid wooden doors so constructed as to fit nearly if not air-tight. If an exclusive pot closet is desired, it should be handy to the range and be under cover for sanitary reasons.

Substitutes for a Table

Frequently in a small kitchen a counter or drop leaves against the wall are substituted for a table, but in most kitchens a good-sized substantial table, preferably in the center of the room, is found indispensable. The table should have a smooth top that can be easily kept clean.

The service part of the house, of which the kitchen is the central room, should fit together just as parts of a machine and form a unit in themselves. The pantries, storerooms, etc., should be placed so as to afford easy access one to the other.

In a house which has two or more servants, a dining room or alcove should be provided for their use. This may be a part of the kitchen or immediately adjoining and merely large enough to comfortably seat the servants around a table.

The cook's pantry should contain cupboards in which are all the necessary paraphernalia for preparing pastries, puddings, etc., such as bins, bakeboards, crockery, pans and supplies, and should be lighted by at least one window.

The Butler's Pantry

The butler's pantry, or china closet, as it is often called—generally located and affording direct communication between the kitchen and dining room—is essentially a serving room, and should contain a sink with draining boards, cupboards and shelves to accommodate the fine china, glassware and other requisites for the table. With such a plan the door between the pantry and kitchen may be either sliding or double swinging, but between the pantry and the dining room, a noiseless double-swinging door. A slide, with small shelves or counters on either side, between the kitchen and pantry, for the passing of food and dishes, saves time and steps. It is well to have the communication rather indirect through the pantry to prevent in a measure the passage of odors or a direct view of the kitchen by those entering the dining room or seated at the table. This can be partly accomplished by not having the communicating doors directly opposite each other. The outside entrance to the kitchen should be so placed as to facilitate the delivery of provisions, preferably through an entry or an enclosed porch.

The laundry in many houses is combined with the kitchen or immediately adjoining, in which latter case it often serves as an entry and a place to store certain articles, such as brooms, buckets, and possibly the refrigerator. The very best plan is to have the laundry in the basement, with separate outside stairs. In such a case, a chute for sending soiled linen, etc., should run from the kitchen or pantry to the laundry.

Light and Ventilation

The kitchen should, above all, be well ventilated and have plenty of daylight. The necessary fumes and heat arising from the cooking should be taken care of in such a way that none of it is carried to the dining room or to other parts of the house. This can partly be accomplished by the hood over the range, but plenty of fresh air is required. Generally in country homes the living rooms are given southern exposure, so the kitchen usually faces the north. The best location is either the northern or eastern exposure, as the cooling breezes in the summer generally come from that direction, especially in this part of the country, and combined with the morning sun, make the kitchen cheerful and cool. If possible, there should be exposure on at least two sides, opposite, affording cross ventilation as well as an abundance of light. All windows should be well fitted with screens in summer to keep out flies and other insects attracted by the odors of cooking.

The best artificial lighting is obtained by a reflector in the center of the kitchen.

How Framing Members Are Mutilated

Examples of Dangerous and Harmless Cutting of Floor Joists—Laying Out a Partition and Its Bridging

By James F. Hobart

RECENTLY, while watching the work of a gang of pipe-fitters in a new store and flat building, I was led to mark the careless and even dangerous methods employed in cutting away sections of floor joist to permit gas and water pipes to be installed. The top edges of five adjoining joists had been notched in several places to permit several ¾-in. pipes to be laid just under the floor, and while I was looking at them, the gas fitter was cutting deep notches in the underside of the five joists, to permit a 2-in. pipe to be run as shown in Fig. 1 in a building in Fort Wayne, Ind.

I took pains to observe very closely the extent and location of the several cuts, and Fig. 2 shows them as exactly as can be done without taking actual measurements. It goes without saying that the joists are greatly weakened at and by the large notch on the lower side of the joists.

It is frequently possible, in cases of this kind, to arrange the pipes in such a manner that cutting the joists will not weaken them appreciably. Such is the case when the cuts are located as shown in Fig. 3. There, the deep cut is located close to the wall of the building, or a partition, and the joist may be cut away a good deal more at that point without weakening it to any extent. The reason is that a loaded beam, supported at the ends, may be made very shallow at either end, but must be deep in the middle to sustain the load placed upon it.

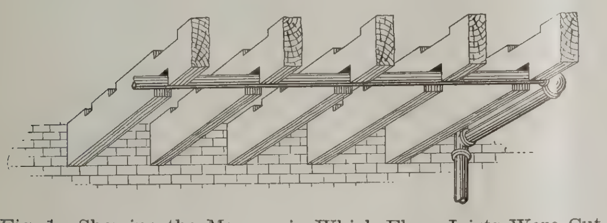


Fig. 1—Showing the Manner in Which Floor Joists Were Cut to Provide for Run of Pipe

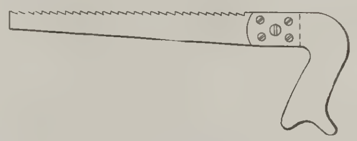


Fig. 4—Saw for Cutting the Under Side of Joist

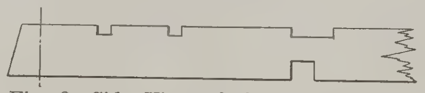


Fig. 2—Side View of the Joist Showing Position of Cuts

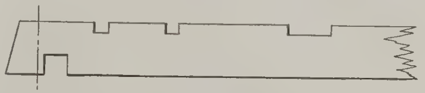


Fig. 3—Cuts so Arranged as to Reduce Danger to a Minimum

How Framing Members are Mutilated

But, according to theory, the depth of a beam may be reduced near its bearing point to almost a line, without impairing its load-carrying power. Therefore, in Fig. 1, had the 2-in. pipe pased directly through the joists and had the offset been made between the fifth and sixth beams, leading from the wall to the point where the pipe goes up through the floor—with the joist cut there, they would be amply strong enough to carry the load; but with the under edge cut located a considerable distance from the wall, it cannot help but greatly weaken the joist.

It would be well for architects in designing stores and dwellings to make provision for pipes, so that the beams need not be cut in pieces to permit pipes to be run. Some architects do this, others seem to pay no attention whatever as to how the pipe fitter and the plumber are to get the various conduits into their proper places.

Aside from the weakening of joist, the cutting into them, particularly on the under side, is a hard job, which is very troublesome at best. The standing on a ladder and forcing a saw to cut the overhead beams is not an enviable job at best. The little tool shown in Fig. 4 makes under-joist cutting comparatively easy. It was made by a pipe fitter who used a piece of old handsaw and fitted it, bottom side up, to a handle resembling that of a cheap keyhole saw.

In another part of the same building where the beam-cutting took place, I saw a couple of men erecting a partition, and they worked to such good advantage that several sketches have been made to show their methods, in the hope that other carpenters may profit by the example.

It was the intention to erect a short partition from *A* to *B*, the top of the partition extending from *C* to *D*, as shown in Fig. 5. Several other pieces of partition were being erected in this building, but the operation being practically the same for all, the method employed for partition *A-B* will suffice for all the others. When very long partitions were erected they would be put up in sections, the length of each being that of a single scantling, from short lengths as at *A-B* up to 16 ft. When such long lengths were to be raised three or four men were required, but for short sections up to 12 ft. only two men were necessary.

The first step was to lay down two pieces of 2 x 4-in. scantling from *A* to *B* and mark on the side of both the places where the studs were to be set as shown in the illustration. Next, the top piece marked was removed and carried to the position shown by *E-F*, where it was nailed to the top of the six studs which comprise the partition. The lengths of these studs were obtained by measuring from *A* to *C* and from *B* to *D*, and then laying off these lengths on the studs which were cut off and nailed as stated, to *E-F*.

Next, the piece *E-F* was picked up by both carpenters acting together, and swayed into place as shown at *G-H* in Fig. 6. The feet of the studs being on one side of piece *A-B* were 2 in. short of reaching to the overhead floor beams. Thus, the partition could be moved at will and the top put as closely as possible where it was designed to be fastened.

Having gotten the top scantling as closely as possible into position, raise scantling *G* by means of stud *I*, swing that stud sidewise until it is fair upon *A-B*, then slide stud *I* toward the perpendicular as far as possible, but do not drive it until after a similar operation has been performed with stud *J*.

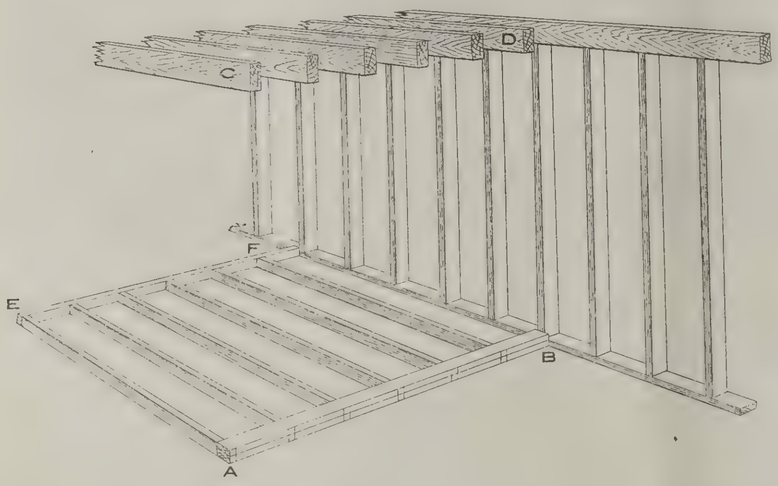


Fig. 5—Erecting a Short Partition

With both these studs swung up as shown in Fig. 6, drive the scantling *G-H* into its exact position, then drive the studs *I* and *J* into their perpendicular positions and toe-nail them at the bottom. Next swing each of the other studs sidewise, one at a time, until they will go upon the lower scantling *A-B*, after which each stud is driven into place and securely toe-nailed.

For a finishing touch, one of the carpenters climbed a ladder and tapped the scantling *G-H* a few times while the other workmen held a plumb rule against the partition studs. When in position to suit, the carpenter on the ladder toe-nailed *G-H* fast to the ceiling beams and the job was done.

If an ordinary level with a plumb bubble be used a straight edge should be used to compensate for any short crooked places in the studs, but it is better to use a very long plumb rule for this work. A tool of this kind forms its own straight edge.

Too little attention is paid to the bridging of partitions by some carpenters, and there is nothing which adds so much to the stability as one or two good lines of bridging.

It saves a whole lot of time and trouble in the end, and costs comparatively little. A good way of finishing the bridging of a partition which ends at a door or other open space is shown in Fig. 7. Here, the bridging is run in the ordinary manner until the last space is reached, when the bridging is put in place as shown at the extreme left in the sketch, thereby making the last bent of the partition very stiff indeed. If the last stud be doubled, as is frequently done, the combination makes a most excellent one against which to hang doors.

The common method of bridging a partition seems to be that of cutting off headers from waste pieces of scantling, and toe-nailing them in barefoot, but it is claimed that the regular strip bridging gives a far stiffer wall than it is possible to obtain by header-bridging.

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Ancient City of Peru

The ruins of Macchu Pichu, a city probably built by the Megalithic race, who preceded the Incas, were discovered by Hiram Bingham on his 1911 expedition to Peru. The ruins are on an almost inaccessible ridge, 2000 feet above the Urubamba River. They are of great beauty and include palaces, baths, temples and about 150 houses.

The huge blocks of white granite, some of them 12 feet long, were so carefully cut that they match perfectly, says the *Argonaut*. Though no mortar or cement was used to hold the stones together, the walls have withstood the elements for at least 2000 years.

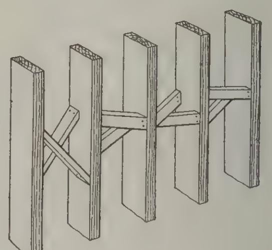

Fig. 7—Finishing Bridging for a Partition Which Ends at a Door or Other Opening

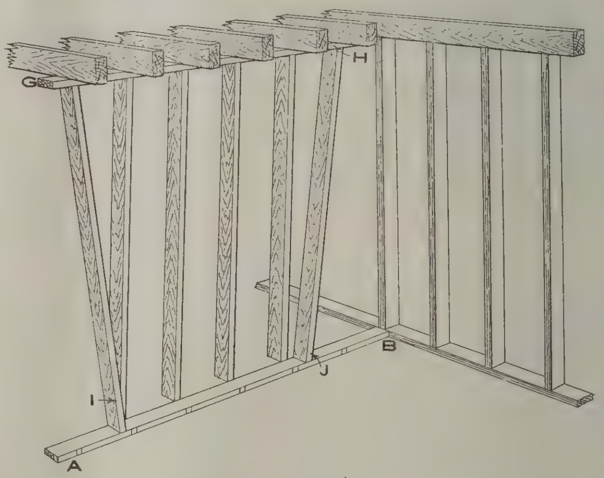

Fig. 6—The Partition in a Raised Position

How Framing Members are Mutilated

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According to a recent issue of the *Bulletin*, published by the Chamber of Commerce of the Borough of Queens, New York, there were 20,968 buildings constructed in the various sections of that borough during the last five years. The greatest activity was in 1912 when 4,955 were erected.

BUILDING AGE
NEW YORK

Many Norway Homes Built from Logs

Early Examples of Log Cabin Construction—Various Forms of Roof Covering

NO one knows when the first log cabin was built in Norway, but it must have been about 1,500 years ago at least. At first they were windowless, chimneyless things, then they gradually became light and airy, acquired chimneys and floors and developed into one and one-half and then into two-story houses, becoming the homelike abode of enlightened people, says *The Craftsman*. Their development and transformation are easy to understand, thanks to the efforts of Dr. Sandvig, of Lillehammer, Norway. Born in the country, he had from his boyhood a passion for the old homes of the peasants, and even as a child it pained him to see them set aside or torn down to make way for the nondescript buildings of clapboard which appeared in their stead. It became his ambition to collect, before it was too late, the most typical example of the different log cabins. He had no money, so he had to earn enough to support himself and his ambition. Through ceaseless efforts he succeeded. Finally the government bought his collection, and the little village of these bygone homes forms a picture of the history of Norwegian development.

A Picturesque Log Châlet

Those who have traveled in Norway, if they have been out of the beaten track and have walked across the barren mountain tops or through pungent pine forests, will remember coming some evening when the sun was still high to a little log châlet looking strangely picturesque from the outside. And they will remember when the door was opened how they entered a large room where the white wooden floor was strewn with sprigs of fresh juniper and where an armful of green birch filled the fireplace ready to burst into a pungent flame when a match was set to it.

In Norway these homes are made of heavy pine logs. The bark is carefully taken off and then the logs are hewed square and of the same size from one end to the other. It takes some experience to notch them at the ends so that they fit exactly. The logs are usually either stained or oiled, and their rich yellowish or brownish color is in harmony with any surrounding.

Log Cabins with Sod Roofs

The old-fashioned Norway log cabin had a sod roof. It is hard to express the poetry those words should convey except to those who have seen the sod roofed cabin. I have come across roofs that were a riot of wild pansies, and I have seen wonderful roofs, where wild rose bushes hung over the eaves, or a daisy roof, the effect of whose white, starlike flowers topping the dark brown wooden structure was very picturesque.

Some roofs produce only pasture grass, and the story runs in Norwegian folk lore that a lazy man led the cow on the roof—the cabin was built against a hill—instead of taking her to pasture. I have no doubt that the story is true, for I have often seen a couple of the white kidlets gamboling on the soft green housetops, while the mother goat, grave and ruminative, was tethered to the chimney.

Sod roofs are just as watertight as others, if they are laid correctly. A roof is first laid on a house, and this is covered with a layer of birch bark. On top of this comes a layer of sod, with the grass turned down to the roof, then a thick layer of earth, and finally another layer of sod, this time with the grass up. The result is a most exquisite and poetic covering for the house.

The Cottage of Peer Gynt

While all these old houses are haunted with traditions, the cottage that belonged to Peer Gynt, the hero of Ibsen's drama, is naturally most romantic of all. His cottage has two stories and was built at the end of the sixteenth century. Peer Gynt was a real person, and lived some time during the seventeenth century at Fron. He was a mighty and powerful man, and very wealthy. But he was peculiar, inasmuch as, although he had a beautiful house and land, he preferred to live in this little cottage, and he liked to wander off for weeks at a time, being out in all kinds of weather. This had given him the habit of half-closing his eyes to gyme, as they called it, and on account of this mannerism he was dubbed "Gynt."

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Bricks by Parcel Post

The value of the parcel post system of delivery has been demonstrated time and again, but the latest use made of it is the sending of bricks for building purposes by this means. On Deal Island in Chesapeake Bay, about 26 miles from Princess Anne, the Methodist Church, which was destroyed by fire in March last, is to be rebuilt. The materials entering into the construction are expensive by reason of the cost of transportation, and the idea has been suggested of asking people to send to Winona, located on Deal Island, a brick each by parcel post for the construction of the church In this way the congregation expects to secure enough bricks to build a church to replace the old frame building that was destroyed. The name of the sender of each brick will be written on the surface and this side will be on the interior of the church.

◆

The entire barn and barnyard on a farm in Champaign County, Ohio, are floored with concrete 5 in. thick. There are over 18,000 sq. ft. of such floors.

Suburban Home of Shingles and Stucco

The Arrangement of the Living Room One of the Noticeable Features—Some Figures of Cost

A BLENDING of an exterior of stucco with a roof covering of shingles stained a Nile green are the dominant features of the suburban home which constitutes the basis of our colored supplemental plate this month, and the plans and details of which are found on the following pages. The quaint architectural treatment gives to the design a cozy, homelike effect which will attract attention wherever it may be executed.

The Unusual Living Room

The noticeable feature of the layout of the first floor is the living room extending as it does from front to rear of the house, and from the center of which rises the chimney with fireplaces on both sides of it. Flanking the fireplaces are arched openings, which add charm and individuality to the room. At the right are dining room and kitchen communicating with each other through a commodious pantry, while at the left is the reception hall and the study. On the second floor are four sleeping rooms and a bathroom.

The footing courses project 6 in. on each side of the concrete foundation walls and are 10 in. thick. The frame of the house is of hemlock, all outside studs being covered with 1 x 10-in. tongued and grooved North Carolina pine boards laid diagonally and covered with heavy tarred building paper. This in turn is covered with painted metal lath attached to V-shaped metal furring, and to which is applied three coats of stucco.

The Concrete Mixture

The mixture consists of one part Portland cement, three parts sand and not more than 8 per cent or 10 per cent lime putty for scratch coats. The finish coat consists of one part cement and two parts sand. In warm weather the walls should be sprayed once or twice a day for several days to keep the stucco from drying out too quickly.

The roofs are covered with cedar shingles laid alternately in single and double courses well secured to the shingle lath by means of heavy galvanized iron nails. The shingles were dipped in Cabot's stain before laying, and afterward given a coat of Nile green stain. All leaders, gutters, roof flashing, etc., are of sheet metal painted on both sides before installing.

All walls are lathed and plastered three-coat work and given a hard white finish.

The chimneys rest on spread footings and are built of irregular coursed field stone. The fireplaces in the living room are of tile. The front terrace and side porch are finished in hard burnt tile 10 x 10 in. square laid with troweled joints.

The finish of the entire wood work in the rooms on the first floor with the exception of the kitchen and pantry is of oak; that of the rooms on the second floor is white wood, while the doors are of birch. The interior trim of kitchen and pantry is North Carolina pine. All entrance doors are 2 in. thick, veneered with quartered oak on white pine cores and glazed with polished plate glass. The entrance door is provided with Yale spring lock and latch. The pantry doors are double acting.

All bathroom fixtures, kitchen sink., etc., are of porcelain enameled iron, and the entire system is properly vented.

The building is piped for gas and wired for electric lighting, combination fixtures, outlets being provided in all rooms and hallway, also outlet in the cellar and at the front entrance. The heating is by hot air furnace.

All exterior woodwork except shingles have three coats of paint. All interior trim has two coats of varnish and the front entrance door has three coats of spar varnish.

Estimate of Cost of Labor and Materials

The estimate of cost here presented is based on a cubic contents of 27,336 cu. ft. at a unit price of 19 cents per cubic foot. The more important items are as follows:

Excavating	$49.00
Grading	40.00
Masonry	1,260.00
Concrete and cement	377.30
Plastering	294.00
Carpentry	1,000.00
Mill work	755.00
Painting	188.10
Plumbing	314.00
Heating	211.34
Metal work	100.00
Tile and slate	216.00
Mantels	72.10
Gas and electric work	257.00
Hardware	60.00
Total cost	$5,193.84

The plans and specifications for this house were prepared by Frank T. Fellner, architect, 413 Caton Avenue, Brooklyn, N. Y., or care *The Building Age*, 239 West 39th Street, New York City.

◆

A Marvelous Clock

After six years work James Calway, of Skowhegan, Maine, has finished a clock 7 ft. 10 in. in hight and which has involved the use of more than 20,000 pieces. The clock was made entirely by hand from many different kinds of wood. The mechanism is unique in that it includes mechanical figures that march and go through evolutions at certain hours.

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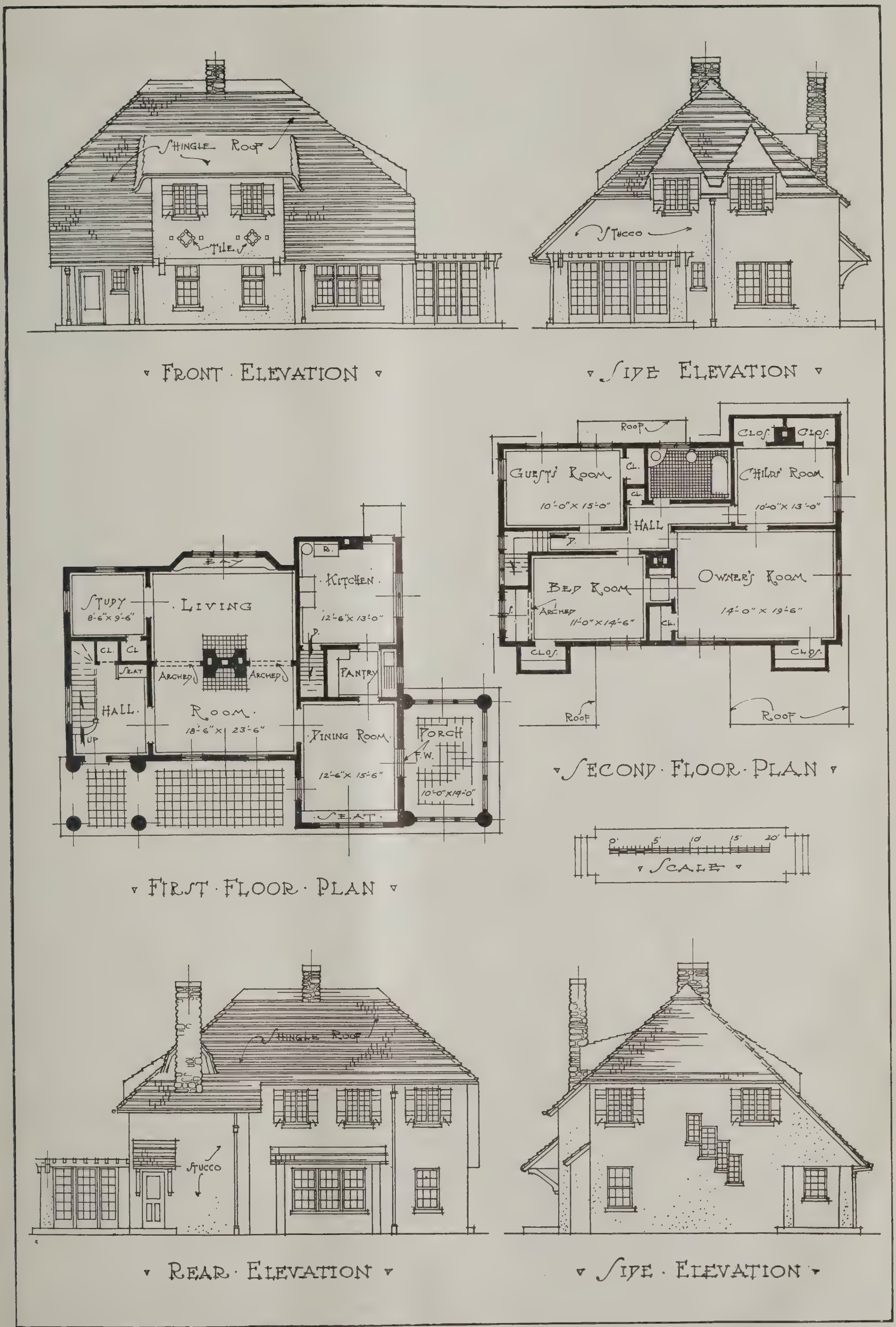
The eleventh annual meeting of the National Paving Brick Manufacturers Association will be held at Buffalo, N. Y., September 9 to 11, inclusive, and with headquarters at the Statler Hotel.



FRONT ELEVATION

SIDE ELEVATION

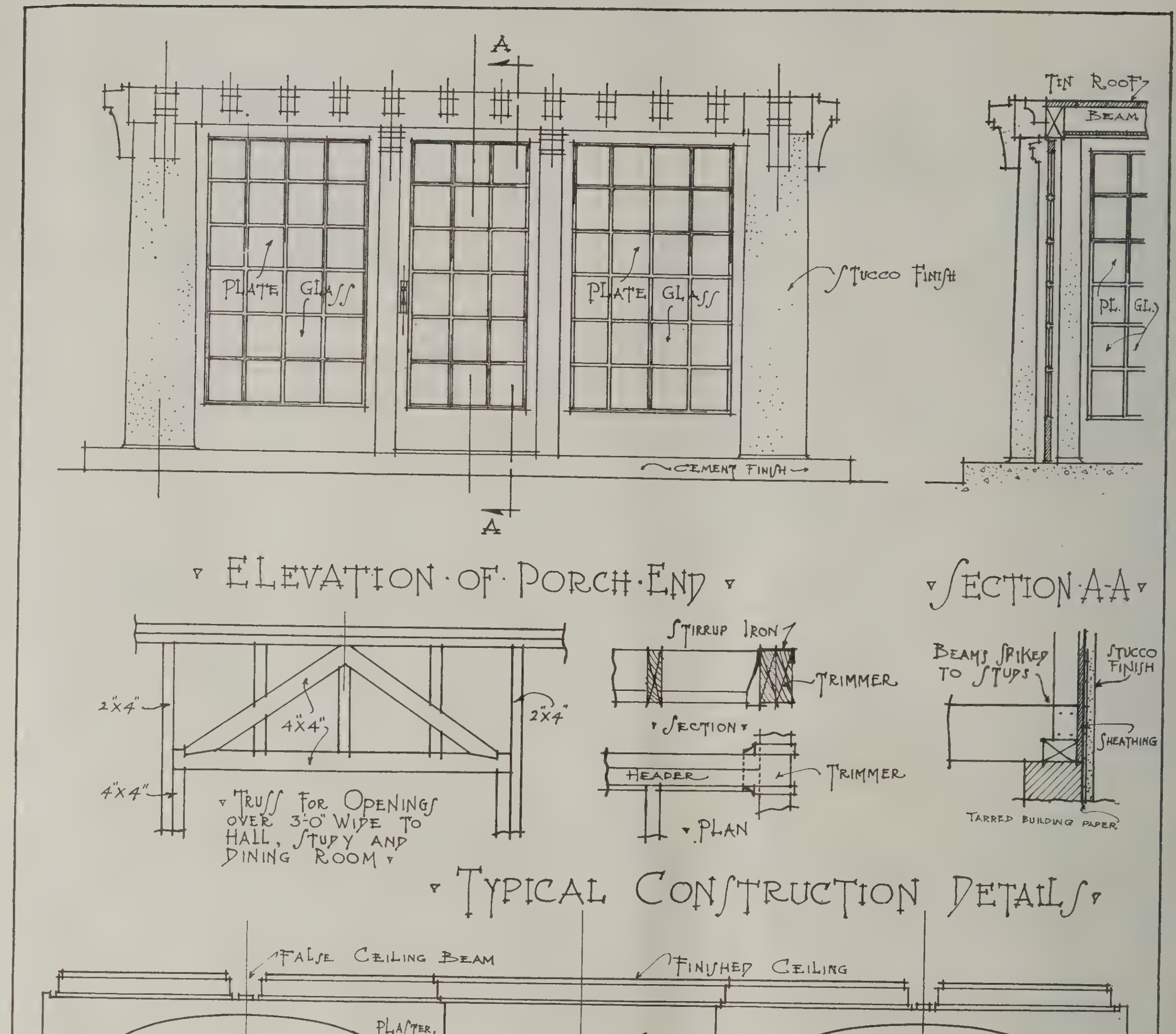
SECOND FLOOR PLAN

FIRST FLOOR PLAN

REAR ELEVATION

SIDE ELEVATION

Plans and Elevations of the Suburban Home, Forming the Basis of Our Colored Supplement Plate



Miscellaneous Constructive Details of the Suburban Home Which Forms the Basis of Our Colored Supplemental Plate This Month

Chicago's New Public Comfort Stations

Two Structures Having Modern Plumbing and Heating Equipment—Ample Provision for Lighting and Ventilation

THE building of two public comfort stations by the South Park Commissioners of the city of Chicago marks another step in providing the city with the sanitary conveniences that have been perceptibly lacking for many years. The comfort stations forming the basis of this article have been erected within a quarter of a mile of the shore of Lake Michigan on a stretch of land known as Grant Park, in close proximity to Chicago's business district.

Separate buildings for men and women have been provided. The structures are a considerable distance apart, being on the north and south sides of a bridge that spans the tracks of the Illinois Central Railroad. At this point there is the Van Buren street station, which plays a somewhat important part in the heating and hot water service for the comfort stations, inasmuch as connections are made directly to the boiler plant of the railroad station mentioned. The efficient methods followed in the sanitary plumbing and ventilating of the buildings were worked out successfully by the architects with practical success by the contractors. The features of the equipments are presented herewith, together with floor plans and photographic views of the roughing-in and finished work.

General View in Toilet Room of One of Chicago's New Public Comfort Stations

Of the two buildings, the men's is the larger, being 31 x 50 ft., while the women's building measures 26 x 50 ft. The conveniences are underground, their location being made known by two large electric light standards erected at the head of the stone stairways leading below.

The buildings have foundations of concrete. Structural steel columns support the roof, and are enclosed full hight with white enameled bricks. The roof is of tile and prismastic glass, and both buildings are splendidly lighted by large skylights, besides the electric lighting fixtures that have been included in the equipment. The floors throughout are of Terrazzo marble, with white enameled bricks constituting the interior finish of the walls.

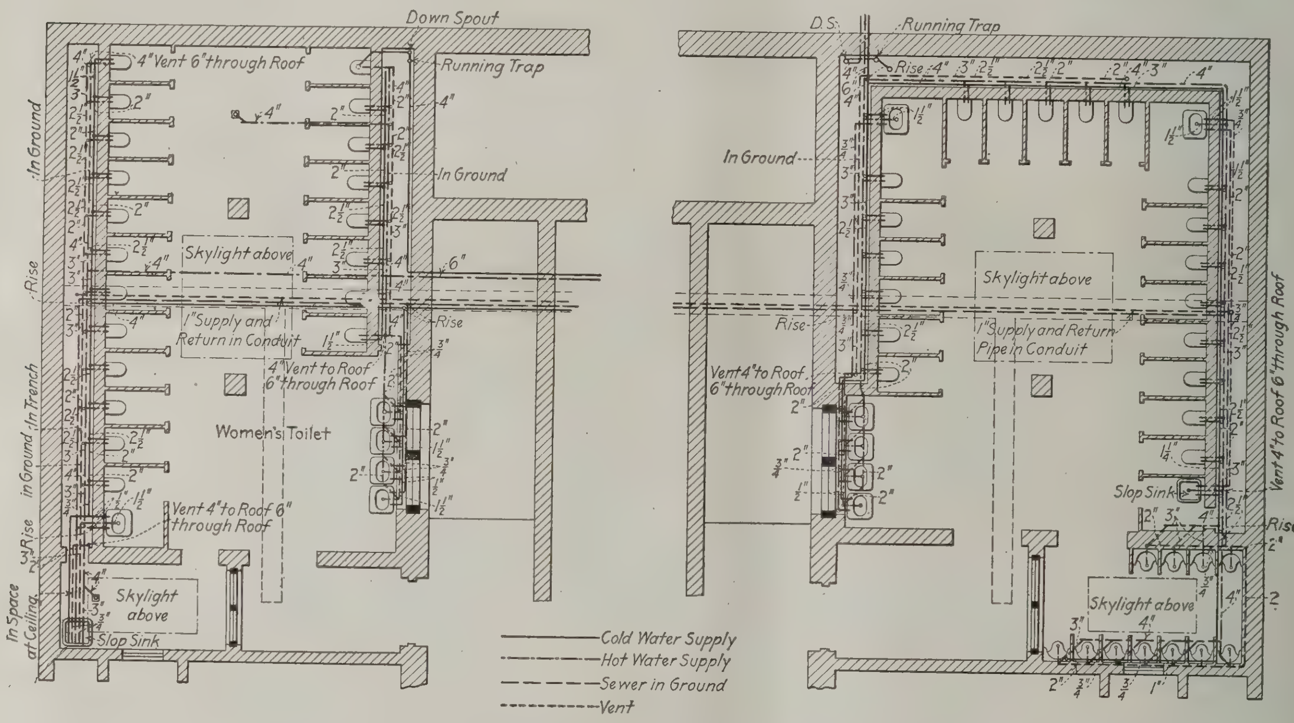
Between the inner and outer walls is a space 2 ft. wide, in which is concealed the various piping supplying the closets, etc. Around the roof is a coping of buff Bedford stone, 4 ft. high, the layers being alternate as shown in the accompanying elevation. The air passes through these spaces, down in the 2 ft. space and thence through 10 x 22-in. ventilating ducts, built in the inner wall. Ventilating ducts of the same size have been put in near the floor beneath the closets to take care of foul air. The doorways in each building are of the folding type, each door having a ventilating duct, 18 in. square in the lower half, the upper half being practically all glass.

The men's building contains nineteen closets, distributed as shown on the accompanying floor plan. Each stall measures 3 x 4 ft., with partitions between of white Alabama marble, finished with a high polish. Both buildings are equipped with two pay stations or private rooms, each 4 x 8 ft., containing a private closet, lavatory and mirror. Four public lavatories are installed in each building as shown, while the northeast corner of the men's department contains the urinals, eleven in all, in two batteries, of four and seven, respectively.

The group of four urinals is flushed automatically by two tanks, each tank supplying two urinals. Three tanks are used to flush the group of seven, two tanks supplying three urinals, while the center one is flushed individually, as will be seen from an accompanying illustration. The tanks are controlled separately by loose key valves and are enameled inside and out. All exposed metal parts and fittings throughout the buildings are of white metal.

The fixtures throughout are of the most improved and up-to-date pattern, all of types made by the L. Wolff Manufacturing Co., Chicago, Ill. The water closets are of the wall outlet type, hung from specially devised supports and entirely clear of the floor. The flushing valves are concealed in the spaces behind the marble wainscoting, and are operated by push buttons. When the seats are lifted they rest on rubber stops embedded in the back wall. The bowls are of the extended lip pattern. The urinals are of the porcelain stall type, and, as mentioned before, are flushed by automatically operated tanks. The lavatories have single-centre legs and are of vitreous chinaware, equipped with "Gielow" self-closing basin cocks. The slop sinks measure 20 x 24 in., each provided with bibs connected to the hot and cold water supplies.

The heating system is of the vacuum type installed by the Consolidated Engineering Co., Chicago, and receives its steam supply from the boiler room of the Van Buren street station of the Illinois Central Railroad. Direct and indirect heating is supplied through a 5-in. main, with returns of 3 in., the latter given a generous pitch. The main piping is of wrought iron and is run in cement tunnels beneath the ground. All piping from the boiler room is covered with a coating of moulded asbestos, 1 in. thick, and finally with a coating of 5-oz. canvas. Each building has a total radiating surface of 750 sq. ft., making the total radiation 150 sq. ft.



Chicago's New Public Comfort Stations—Floor Plans Showing Fixtures in Toilet Rooms

The radiators used throughout are of types manufactured by the American Radiator Co. Those for indirect heating are concealed in the plumbing spaces, supported on wrought iron brackets. Each radiator is covered with a galvanized iron shield at the back, and heat passes through registers 10 x 22 in. There are five radiators in each building for indirect heating and two in each for direct heating. Of the latter there is a radiator in the men's urinals and in the entrance-way, and in the women's department radiators are installed in the attendant's room and hallway. All radiators have valves on the supply and return ends.

One of the accompanying illustrations shows the connections for one closet and four lavatory wastes, together with the vent pipe and hot and cold water connections. The roughing-in work on a number of closets in the men's building is shown in another and also the position of the air duct. The sleeve to be seen above the waste pipe is for a 2-in. flush pipe. Above and to its left is a sleeve, 15 in. from the push button, used in connection with the flushometer valve. The third picture shows the roughing-in work for a battery of closets in the women's building. A downspout is to be seen and a 2-in. vent pipe going over to connect with four lavatories. The ends of the hot and cold water supplies can also be seen in the foreground.

The sewer connection is 8 in. in diameter, and is made with the city sewer in Michigan avenue. The soil pipes in the building and to a point outside of the walls are of cast iron, and beyond that of vitrified tile. The connection of the iron and tile sewers is made with a collar of brick laid in cement made of two rings of brick, with a 6-in. bearing on each side of the joint.

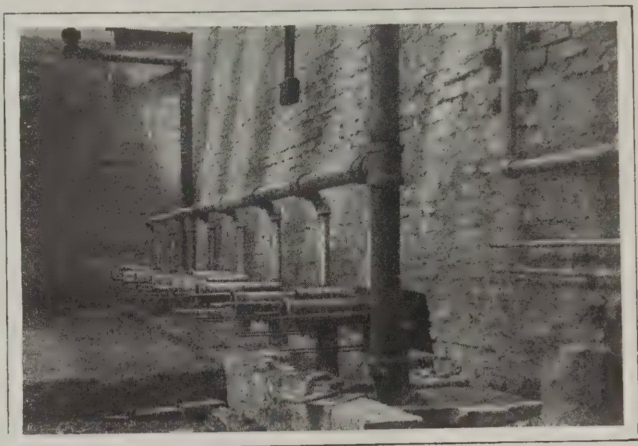
A typical waste and vent line is reproduced herewith, and at points shown on the plans, the main vent stack continues to the roof in 4-in. diameter pipe, terminating almost at the top of the increased coping to 6 in. diameter. Branches for the ventilation of traps have been installed as shown on the plans, all openings being left above the outlet of the fixture at such a height as to give continuous flow from the connection to the waste pipe. Downspouts are of wrought iron, with direct connections to the sewer. At points shown on the floor plans, extra heavy cast iron combination, deep seal and back water gate floor drains have been installed, connecting with the sewers. These drains are of a special type made by the Wade Iron Sanitary Manufacturing Co., Chicago, Ill.

The cold water supply is brought from a 6-in. city main supplying Grant Park, through a 4-in. cast iron main direct to the men's building. On reaching the building a 4-in. main branch for supplying the closets at the back and closets and urinals on one side is taken off and short connections to the fixtures are made as shown. Another 4-in. main branch is taken off to furnish the supply for the remaining battery of closets and the lavatories on the other side. The women's building is then supplied by a 4-in. galvanized iron pipe running from the men's building, through the station's boiler room, where the piping is suspended from the ceiling and finally continued beneath the flooring of the women's department.

The first branch to be taken off here is of ¾ in. diameter, enclosed in chases, and supplying the four public lavatories. Cold water connections to the battery of closets on the same side are then made with a 1½-in. branch, the main continuing beneath the building to supply the remainder of the closets on the opposite side, together with the private pay station and the attendant's room in the corner of the building.

Hot water for both buildings is supplied by a Humphrey gas water-heater, manufactured by the Humphrey Co., Kalamazoo, Mich. Connected to this is a 40-gal. tank, equipped with a thermostatic valve to maintain an even temperature for a continuous supply of hot water to the faucets at all times. The connections to each building are separate, each being ¾ in. Connections to the slop sinks and lavatories are taken off as shown on the accompanying floor plans.

The plumbing contract was executed by the E. Baggot Co., and the heating installation by the American Heating & Plumbing Corporation, from plans prepared by D. H. Burnham & Co., all of the city of Chicago, Ill.



Roughing for Battery of Wall Outlet Closets

Roughing for Range of Lavatories

Closet Connections for Wall Outlet Type of Bowls

Chicago's New Public Comfort Stations

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Location of Furnace and Registers in House Heating

It only requires a clear and concise explanation of the important bearing that the location of the furnace has on the success of a warm-air heating system and the economy in fuel which will result from proper location for the owner of a building to join hands with the furnaceman in getting the furnace put in the right place. The right place is admittedly that which will call for the shortest possible run of piping to all the registers on the system.

At times the owner of the house is desirous of avoiding the placing of a register at some particular point often on account of the way in which the room is furnished. In such an event he generally will permit the register to be placed at another point no further away from the furnace and in an equally advantageous position so far as heating is concerned. In fact it is the duty of the furnace heating contractor to adapt his work as far as possible to the convenience and pleasure of the owner, but if a location is selected that will make successful heating difficult and will entail the forcing of the furnace in severe weather the customer should have this made clear. When this is done by the competent furnace man he as a rule will find that his customer will permit the reasonable thing to be done.

One of the greatest troubles found in the average practice is to get a fresh air supply duct that is large enough. A good influence is being exerted upon the design of warm-air systems in relation to the air supply duct by the circulation of air from within the building. The majority of men seem to realize that a larger inside air duct is needed when the air is taken from inside than from out of doors, and they also find that there is little advantage in making the ducts of two different sizes, particularly if the two come together at a point controlled by a damper so that either outside or inside air can be used at will. The only kind of material fit for making an air supply duct is sheet iron. Whether it is of a round or rectangular shape, it should be galvanized to protect it from rust, and heavy so that it will hold its shape and permit of efficient dampers being used.

Chicago's New Public Comfort Stations—Marble Compartments in Toilet Room

Notwithstanding the various rules that can be used by furnacemen with advantage, the use of common sense has the most important bearing on the design of the work in the end. Its installation in such a manner as to avoid friction and the location of registers and furnace must be governed by common sense rather than by any fixed rule. There are, however, a few things that govern the situation. First of these is the heat lost by transmission through the walls and windows and by the escape of the air brought in to make room for more warm air. In consequence, it has been found that good practice requires the air in residences to be changed two or three or more times per hour. With the cubic contents of the room known and multiplied by 2, 3 or 4, the total volume of warm air required is known. The velocity at which air will flow through the furnace heating system is also well established, and this is not over 6 ft. per second for first floor rooms and more often 4 ft. or 5 ft. It is also good practice to allow a velocity of not over 8 or 9 ft. per second for the air flow to second floor rooms. With this velocity and the total amount of air required known, it is a calculation which a grammar school boy can make to determine the size of the riser and warm-air pipes.

When this is known the size of the furnace required can also be readily computed from manufacturers' ratings, as proved by experience with different types of furnace.

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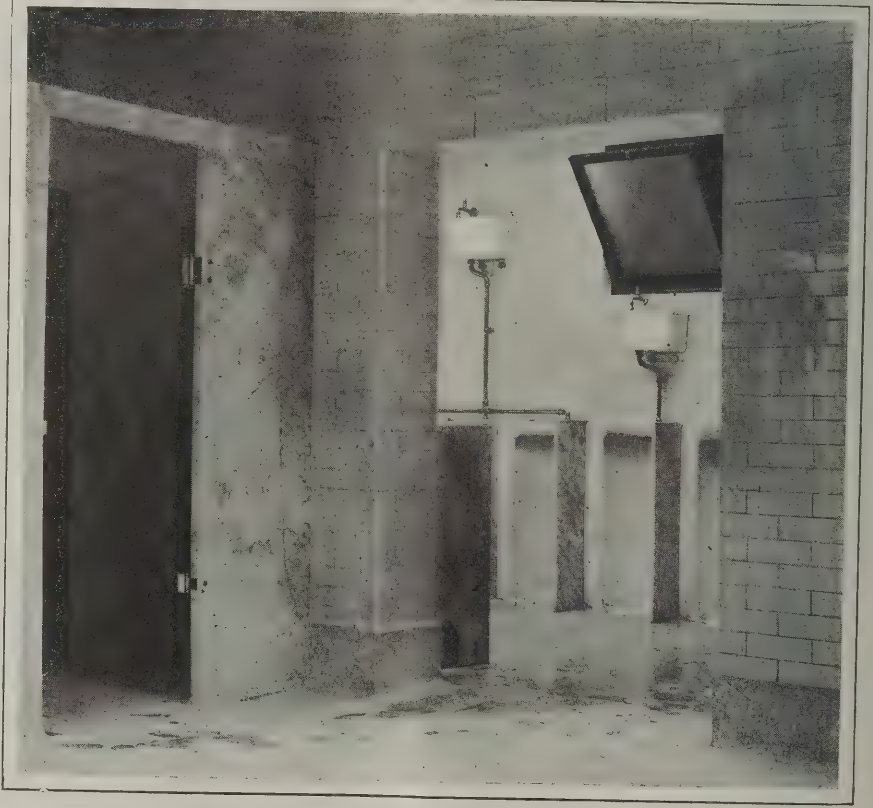
Use of Pipe Scaffolding

An interesting example of the use of steam pipe falsework for scaffolding is described in a recent issue of *Beton u. Eisen.* It was used in renovating the dome of a church in Baden, the dome being about 120 ft. above the floor level. The scaffolding was required to support a load of about 240 lb. per sq. ft. The falsework consisted of sections each made up of 10 ft. to 20 ft. of steel pipe 3 in. in diameter. At the joints steel pipes of slightly smaller diameter and about 20 in. in length were used. These were fitted inside the first steel pipes and had at the center a steel band of the same diameter as the outer pipes and measuring 5 in. in width. Angle irons in horizontal and inclined position were used as diagonal and transverse supports. The bases supporting the vertical pipes were composed of iron shoes resting on wooden or concrete beds.


Showing Layout of Toilet Fixtures

Cobblestone Effects in House Design

A Seven-Room Dwelling in Which the Sun Parlor Is a Noticeable Feature—Some Details of Construction

ONE of the desirable features of a private dwelling, especially in the country places where flies and mosquitoes are plentiful, is a screen porch, for as a general thing the comfort derived from it is out of all proportion to the small expense involved in its construction. When, as in the case of the house here described, the screen porch is so large that it becomes a prominent feature of the exterior treatment, it is apt to serve more or less as the living room during a goodly portion of the summer months. The half-tone picture of the house shown on a following page was taken with the porch screens removed in order to bring out more clearly other features of the first story. The porch is 10 ft. wide extending across the front of the house a distance of 28 ft. 10 in. and around the side for a distance of 12 ft. 6 in.

The front door leads from the porch directly into the living room. The latter is lighted by a window in the front and one in the side wall facing the porch, and is provided with a gas log to supplement the hot-water heating system. The main stairway rises directly from the living room, as shown on the plan.

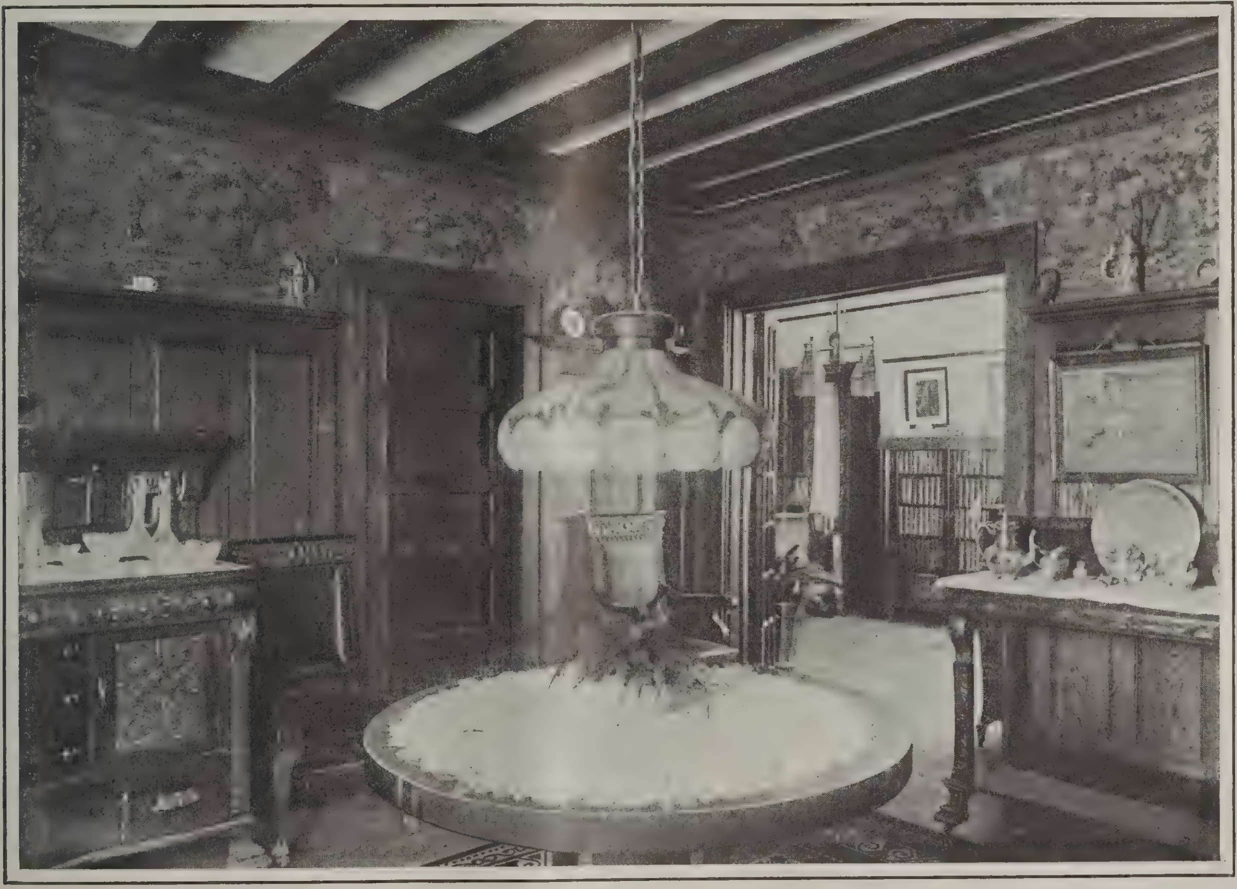
A large bay window which looks out upon the side street has a convenient box seat, while on the inner wall is a built-in sideboard. A swing door connects with the pantry.

A desirable feature at this point is the combination stairs which permit direct access to the second floor from the rear of the house without the necessity of passing to the front. Cupboard space is provided in the pantry, and a door leads to the basement and another to the kitchen.

A gas range is installed in the kitchen and the room is lighted by two windows in the outside wall. A door leads to a small rear porch.

The main stairs land near the center of the house on the second floor and from them the three bedrooms and bathroom are readily accessible. The main bed chamber is a large room measuring 12 ft. 5 in. x 17 ft. 10 in., and is well lighted. Opening from it is a small sun parlor with bay at the side. It is of sufficient size to accommodate a bed and may be used as an open sleeping apartment if desired. The other two bed chambers are nearly equal in size and are similar in construction.

A laundry is located in the basement, with gas



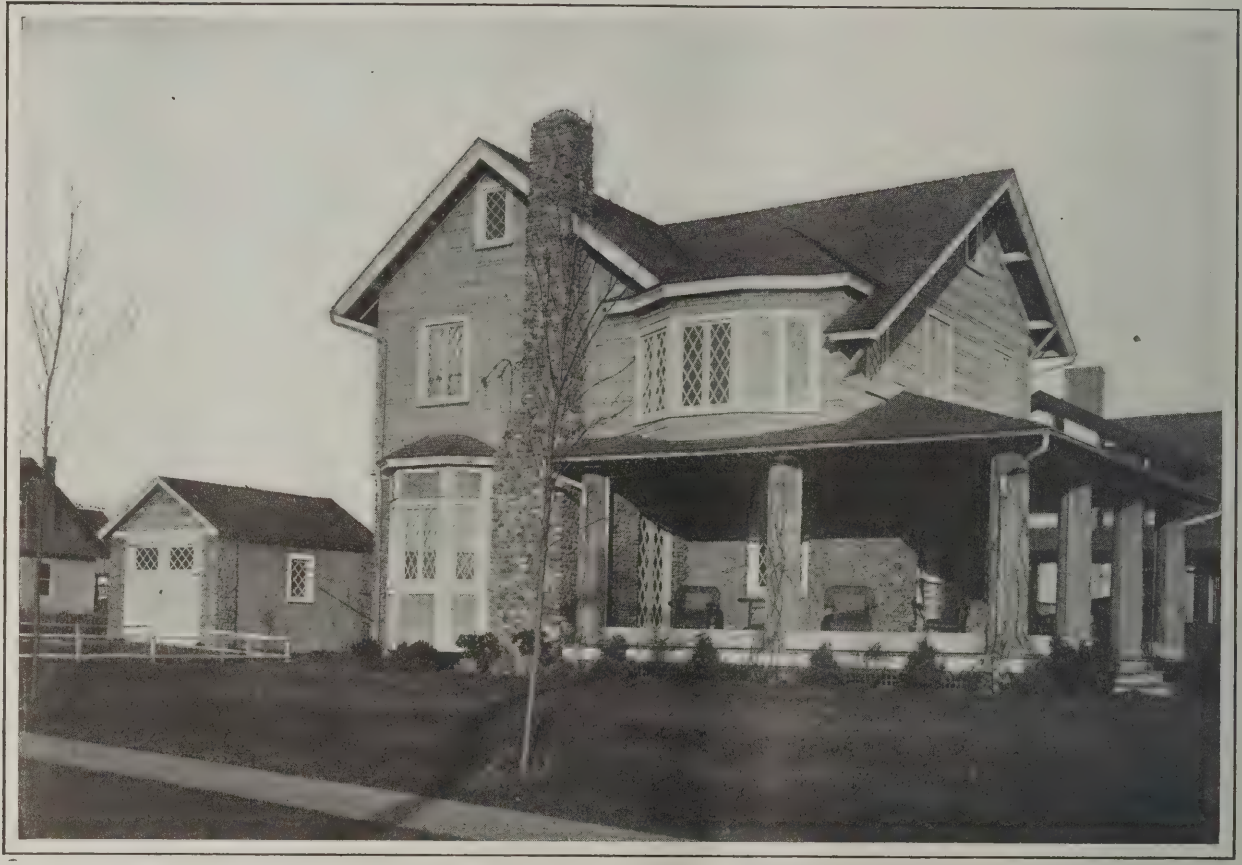
Cobblestone Effects in House Design—View in Dining Room Looking Toward the Living Room connections for the stove and two concrete tubs.

The foundations are of concrete mixed in the proportions of one part Portland cement to four parts sand and gravel. The concrete for the cobblestone veneer of the first story walls is composed of one part Portland cement, two parts sand and four parts loose gravel.

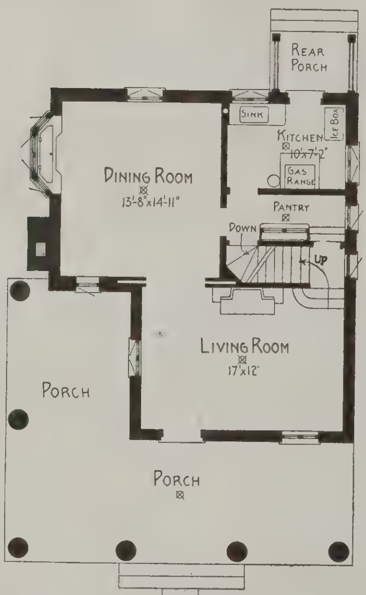
The exterior of the first story walls above grade is finished with a veneer of small cobblestones and concrete. The window and door reveals show cobblestone up to the jambs. The cobblestone chimney is provided with a fire lining which begins at a point 4 ft. from the cellar bottom.

The cellar floor is made of a rough layer of concrete 3 in. thick, composed of a 5:1 mixture of cinders and Portland cement, over which is spread a ¾-in. finishing coat of Portland cement.

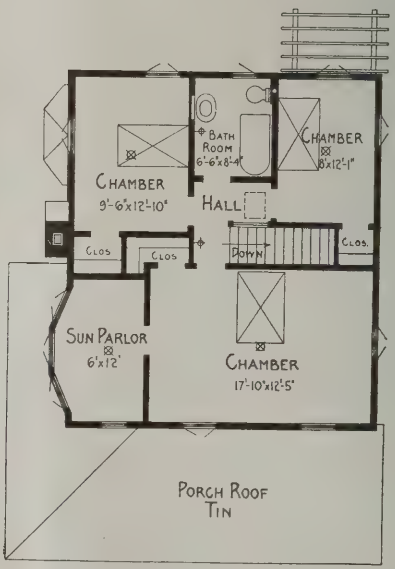
All timber is of spruce, and the headers are framed into trimmers with tusk and tennon joints. All headers over 4 ft. in length are provided with stirrup hangers. Sills are halved at the angles and spiked. All beams under partitions running the



Photographic View of the House Showing Rustic Chimney and First Story Treatment with Garage in the Rear



First Floor Plan—Scale 1/16 In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot

Cobblestone Effects in House Design—John J. Foley Architect, New York City same way are doubled and spiked together, as are those around all window and door openings over 3 ft. in width. The stud partitions are braced once in the height of each story with 3 x 3 in. pieces, and the studding is set flatwise around the chimney and 1 in. away. All floor joists are bridged with 1 x 3-in. cross bridging, one row to each span. Galvanized iron wall ties are fastened to the first story sheathing at intervals of about every 3 sq. ft. of surface, and project about 3 in. from the face of the sheathing.

The sills, posts and girts are 4 x 6 in., the girders 6 x 10 in. and plates 4 x 4 in. The first tier beams are 2 x 10, placed 18 in. on centers, the second tier beams are 2 x 10 in., placed 16 in. on centers, and the third tier beams are 2 x 6 in., also placed 16 in. on centers. The studding are 2 x 4 in. and the rafters 2 x 8 in. The porch sills and girts are 4 x 6 in., the floor beams 2 x 8 in., placed 16 in. on centers; the plate 4 x 6 in. and the rafters 2 x 6 in.

All exterior vertical walls and the porch roof are covered with 7/8 x 7-in. N. C. pine sheathing, placed diagonally on walls and covered with a layer of F. W. Bird & Son's "Neponset" sheathing paper.

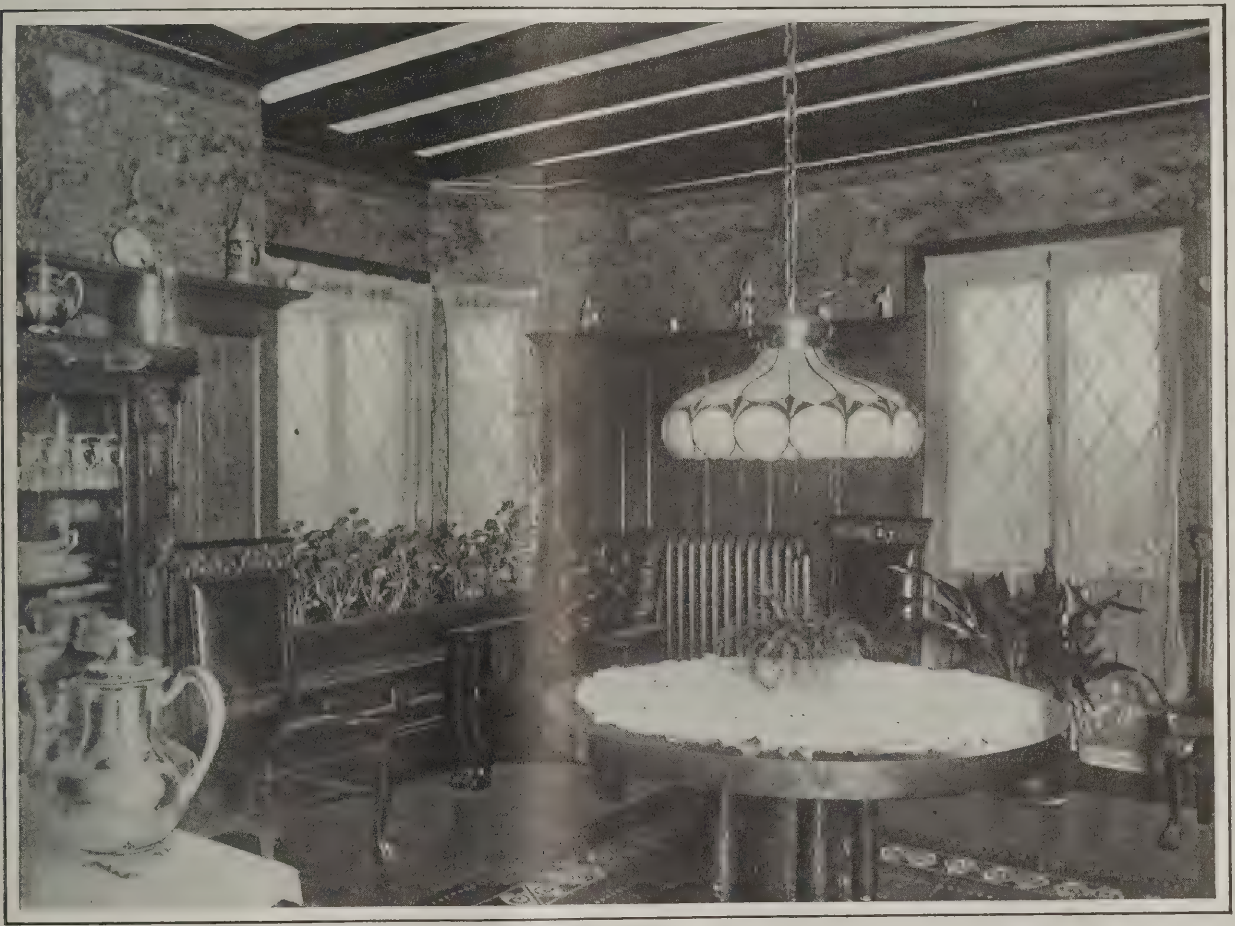
The roof shingles, which are white cedar 18 in. in length and laid 5½ in. to the weather, are laid on spruce shingle lath. The vertical walls are shingled with the same stock laid in alternate courses with exposures of 6 in. and 2 in. to the weather.

The rough floor of the first, second and attic levels is of 7/8 x 4-in. T. & G. N. C. pine stock over which, on the first and second floors, is laid a finished floor of 7/8 x 2½-in. N. C. pine flooring, except in the dining and living rooms, in which parquet floors of 7/8-in. oak are laid. Heavy flooring paper is used between all double floors. The porch floors are of 7/8 x 2½-in. white pine laid in white lead and securely nailed to the beams. All windows are of the casement type, the sash being 1½ in. thick

All outside finish, including the verge boards, is of cypress. The under side of the porch roof is ceiled with ½ x 2-in. N. C. pine ceiling on top of rafters. Verge boards are 1¾ in. in thickness and ½-in. cypress ceiling is used under them.

Outside doors are of white pine, and the inside doors are of material to match trim and are of the five horizontal panel type.

All walls, partitions and ceilings are plastered with King's Windsor plaster on ¾-in. grounds and the finish coat is of plaster-of-paris.



Cobblestone Effects in House Design—View of Dining Room Looking from the Living Room

The finish in the dining room is of selected chestnut; living room, white wood; front bedroom, maple; all other interior trim of cypress.

The dining room is provided with a 6½-ft. wainscot, paneled and surmounted by a 5-in. shelf. It has a beamed ceiling of chestnut. The panels in the dining room wainscot are laid with cement stucco applied in two coats, to finish 7/8 in. in thickness. The final coat is left rough. The bathroom floor is of 1-in. round vitreous tile, and the walls are covered with 3 x 6-in. tile.

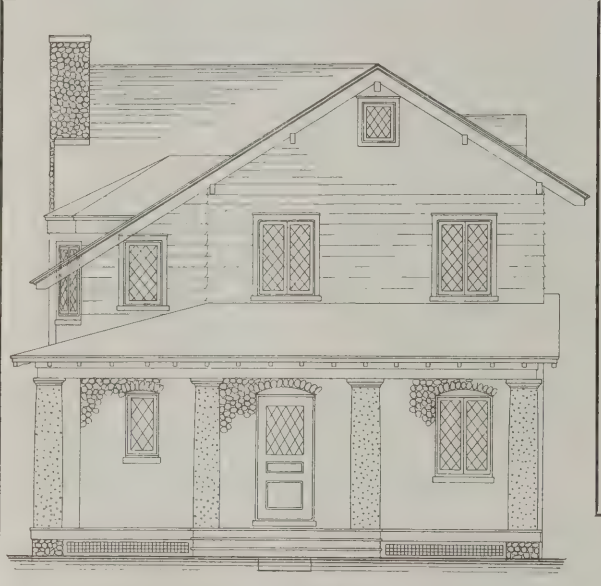
All exterior woodwork has two coats of Samuel Cabot's creosote stain. All exposed work is painted with two coats of metallic paint. The floors of porches and wood steps were given three coats of white lead and linseed oil. All chestnut woodwork received a coat of wood filler finished with a coat of hard oil. All cypress woodwork is painted four coats of a light tint and a final coat of enamel. The parquet floors in the dining and living room were filled with paste filler followed by one coat of shellac and finished with a coat of wax. The dining room trim received one coat of mahogany stain, over which was laid a coat of shellac, sand-papered smooth and finished with hard oil. Maple trim received one coat of shellac and one coat of hard oil.

The house is wired for electricity and piped for gas, combination fixtures being employed. The dining and living rooms have four lights each; the kitchen, laundry and bedroom, two lights; elsewhere one light.

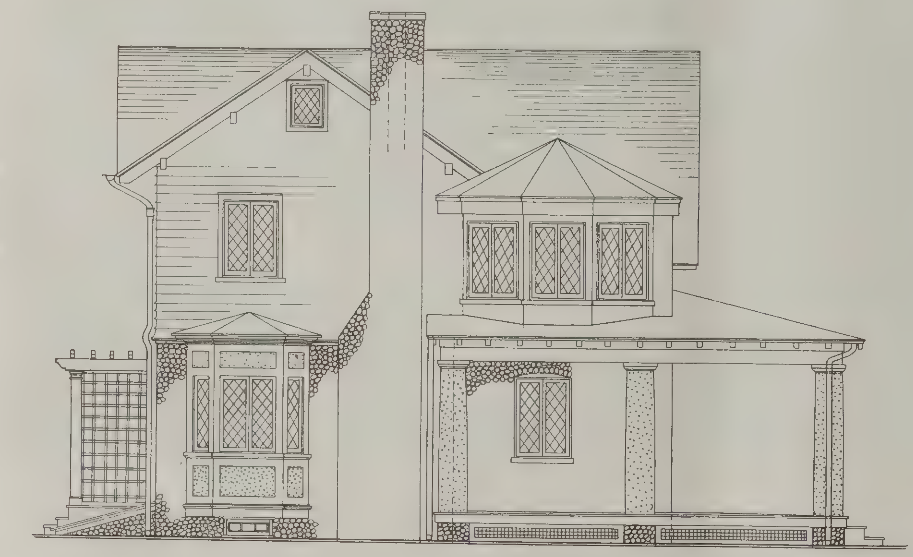
A hot-water heating system is installed, with radiators in every room including the kitchen.

The garage belonging to the house described and which may be seen in the picture of the house, is of timber construction with veneer of stucco and four corner columns with a veneer of cobblestones. The space below the gables on the end walls is covered with white cedar shingles laid in alternate courses 2 and 6 in. to the weather. The roof is covered with 18-in. white cedar shingles laid 5½ in. to the weather. The lattice window in each side wall and the lattice transoms in the doors follow the general design of the residence itself.

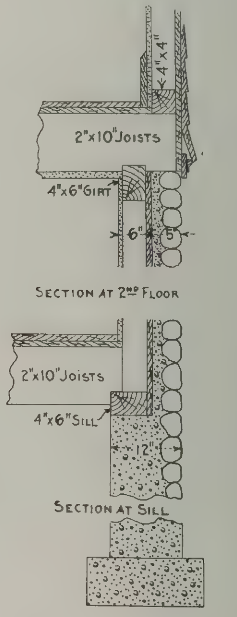
The house here described was designed by John J. Foley, architect, of New York City, for William F. LaHiff, at Bayside Long Island, N. Y.



Front Elevation—Scale 3/32 In. to the Foot



Side (left) Elevation—Scale 3/32 In. to the Foot



Sections of the Main Wall of the House—Scale ¼ In. to the Foot

Cobblestone Effects in House Design—Elevations and Constructive Details

Value of Gypsum Output in 1913

Gypsum, the rock that makes plaster of Paris, was mined in the United States in 1913 to the extent of 2,599,508 short tons, an increase of 98,751 tons over the production of 1912, according to R. W. Stone, of the United States Geological Survey. The total value of gypsum and gypsum products produced in 1913 was $6,774,822, compared with $6,563,908 in 1912, an increase of $210,914. Gypsum sold crude without calcining and used principally as an ingredient in Portland cement and paint and as land plaster, amounted to 463,136 short tons, valued at $697,066, which is a good increase over the business of 1912. About 85 per cent. of the gypsum sold crude in 1913 was used for Portland cement at an average value of $1.49 a ton. The quantity sold for this purpose is steadily increasing. The quantity of gypsum sold crude for land plaster has remained nearly stationary for four years, but the average price dropped in 1913 from $2.02 to $1.75.

There was an increase of 42,175 tons in the amount of calcined gypsum sold in 1913, yet the average price per ton was $3.43—the same as in 1912. A total of 1,680,157 short tons was calcined for wall plaster, Keenes cement, plaster of Paris, etc. About 1,250,000 tons of this amount was used for mixed wall plaster, the so-called cement plaster and hard wall plasters of the building trade.

The Skill Required of an Architect

Results of Carelessly Drawn Plans and the Liability of the Architect for Negligence in Connection with them

By A. L. H. Street

THE skill required of an architect in the preparation of plans and specifications, and his liability for negligence in drawing them, constituted the subject of a recent decision of the Iowa Supreme Court which is reported in full at page 277, 145 Northwestern Reporter. Plaintiffs, a firm of architects, sued to recover the amount of compensation which defendant agreed to pay them for preparing plans and specifications for a business block embracing storerooms and a theater. Defendant counterclaimed for damages declared to have been sustained by him on the ground that the plans and specifications were defective in that, as claimed, the plans for the theater were so defective that occupants of boxes could not view the stage, that trusses over the stage were so placed that valuable curtains were cut off, that an arch was so unskilfully planned as to bulge the sustaining walls, that no proper means of ingress and egress for certain rooms were provided, that ventilation for the storerooms was not provided for adequately, and that details were so defectively prepared that pillars under the balcony of the theater had to be cut off and the balcony lowered.

On trial of the case, plaintiffs recovered the full amount claimed by them, under an order given the jury by the judge to find for plaintiffs. But, on defendant's appeal to the Supreme Court, the judgment was reversed and the case sent back for a new trial on the ground that defendant had made out a strong enough case to go to the jury on his counterclaim.

What the Court Said

The Supreme Court said, in part: "As practising architects, plaintiffs were bound to furnish plans and specifications prepared with a reasonable degree of technical skill, and such as would produce, if followed and adhered to, a building of the kind called for, without marked defects in character, strength or appearance." The court finds that the evidence offered on the trial by defendant to sustain his counterclaim was not wholly satisfactory, but that it was sufficiently strong to go to the jury.

The measure of an owner's damages which he can recover against an architect on establishing that the latter has been negligent in the preparation of plans and specifications, is thus referred to by the Supreme Court: "It may well be doubted whether the record calls for a statement by us of the true measure of damages in such case, but it would seem to be the rule of reason, as we think it is the rule of law, that where the defect complained of is of such character that it may be corrected without unreasonable or disproportionate expense, such expense will properly measure the damage so sustained; but if the defect be so intimately connected with the body of the structure, or so inheres in some permanent part of such structure that it cannot be remedied at reasonable expense or without tearing it down or rebuilding it, or some material part of it, then the rule suggested by the trial court would be applicable." That rule is that the damages are to be measured by the difference between the value of the building as it is in its defective condition and its value as it would have been if built upon correct plans and specifications.

Degree of Care Required

The Kentucky Court of Appeals, having been called upon to determine the degree of care required of architects in preparing plans for buildings and in superintending construction, recently decided in the case of Kortz vs. Kimberlin, 165 Southwestern Reporter 654, that there is no duty to prepare perfect plans, exercise of a reasonable degree of skill in their preparation being sufficient; and that an architect is not liable for a defect in construction, if he has used ordinary care to see that the work is done properly.

In this case Mr. Kimberlin brought suit for compensation for drawing plans for a dwelling house and for superintending its construction, and judgment having been awarded in his favor, defendant owners appealed from a disallowance of their counterclaim for damages declared to have been sustained by them through defective performance of the service. In affirming the judgment, the Court of Appeals said:

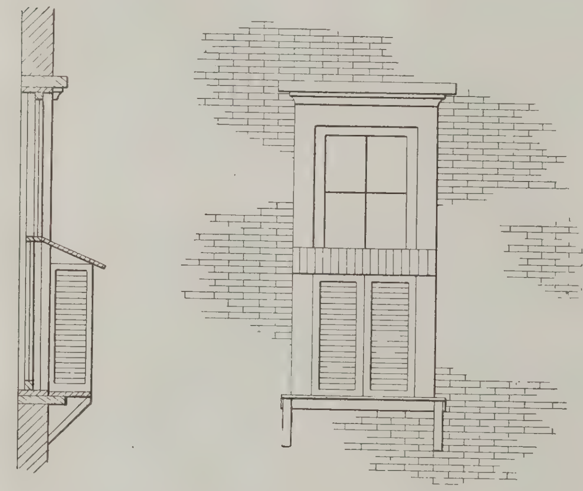
Architects Are Presumed to Possess Necessary Skill

"While it is true that a public profession of an art is a representation or undertaking to all the world that the professor possesses the requisite ability and skill, and it therefore follows that an architect is presumed to possess the skill and ability necessary to the practice of his profession, and is liable for defective plans, * * * yet he does not undertake that his plans will be absolutely perfect, and is liable only for a failure to exercise reasonable skill in the preparation of the plans. Furthermore, if he be employed to superintend the building, he is not liable at all hazards for every defect in its construction, but is only required to use reasonable care and diligence in seeing that the work is properly done. The mere fact, therefore, that some of the material is defective, or that some of the construction work is not done in a workmanlike manner, is not sufficient to establish as a matter of law that he has not fully performed his contract. Under such circumstances, the question whether or not he used reasonable care and diligence in superintending the work is a question for the jury. * * * Take, for instance, the stucco work, which is one of the largest items of damage claimed. The defendants testify that they, who had been occupying the house, could not discover its defective condition until after the time the amended answer was filed. It had only recently begun to peel off. While it is doubtless true that an architect has better means of observation and detection, yet it cannot be said that the evidence conclusively shows that plaintiff, by the exercise of reasonable care and diligence, could have discovered the defective condition of the stucco before it began to fall off. Notwithstanding the proof as to its condition, it was for the jury to say, under all the circumstances, whether or not plaintiff failed to exercise reasonable care and diligence."

◆

Cold Storage Box for the Window Sill

It is possible that some of our interested readers may obtain a suggestion from the accompanying sketches which portray what the Misses Meigs, of Indianapolis, Ind., call "our domestic cold storage plant." This is nothing more nor less than the extension or an enclosing of a window in the pantry, and besides four old shutters which the local carpenter supplied second-hand had nothing more than one board at the bottom for a platform, one at the top for the roof and two braces at either end to act as supports all as shown.



Details of Cold Storage Box for the Window Sill

The object of the extended window sill is to supply a cold storage space for the winter time. Since the lower sash can be raised and lowered it is possible to store fruits, vegetables, milk, etc., during the fall, winter and spring months without the purchase of ice. This scheme might also be utilized during the summer months for similar purposes, although by most people an ice box would be considered essential.

When the lady of the house does her own work and thriftily avoids the purchase of ice during the greater portion of the year and being at the same time desirous of keeping things cool, she is generally obliged to go out of doors, down two or more steps and into a separate vault or box outside of the house. The simple scheme shown herewith, however, prevents climbing up and down slippery steps and has been found eminently satisfactory. Fly screen is tacked on the inside of the shutters so that the lower sash can be kept open during hot weather if so desired. The advantages in brief are a saving of ice; many steps are likewise rendered unnecessary; the carpenter obtains a job at a fair price in which he can use second-hand materials and life is made easier for the housewife.

◆

More Complete Plans and Specifications

We often hear contractors complain that architects' plans and specifications are contradictory, ambiguous, incomplete, and a number of other things, says the last issue of the *Quantity Surveyor*, and the architect is blamed, even by those of his own profession. To this cause is attributed many of the evils from which the building community suffer. Few persons, however, admitting that some of this is true, ever stop to consider the reason just why such conditions exist. We are inclined to think it very seldom arises from downright professional incompetence. Some of it arises probably through negligence, some through accepting work at a fee which makes it unprofitable for the architect to go to the trouble of making proper contract documents. The owners, of course, suffer for this, but it would be a farce to extend to them the least sympathy. They may have sought to get their work done at a low fee, too low for their own good or for the good of anyone concerned. Most of these alleged defects arise through the undue speed which so many owners seem to insist upon.

Now an estimate of the cost of a building cannot be accurate without accurate quantities. That much must be admitted. Accurate quantities on the other hand cannot be prepared from inaccurate or doubtful plans and specifications. It stands to reason therefore that among the many advantages which the quantity system has over our present practices, the greatest perhaps are the great saving of time, greater accuracy in figuring, and last, but by no means least, the undeniable fact that the drawings and specifications must be complete and entirely free from the before mentioned alleged objections. No competent professional quantity surveyor would risk his reputation and his living, by winking at or overlooking incompleteness and uncertainty such as contractors often have to contend with now, when figuring.

With plans, specifications and details as perfect as the human brain can make them, many, if not all the pernicious conditions existing now will disappear. This is a fact which might well be considered by those who are as yet undecided as to the merits of the quantity system and under which absolutely complete plans and specifications are essential. It will be obvious that the raising of the standard of the finished drawings and specifications will discourage the cutting of fees by a certain class of architects.

◆

The highest hotel in the United States will be erected in California at an elevation of 12,000 feet above sea level.

CORRESPONDENCE

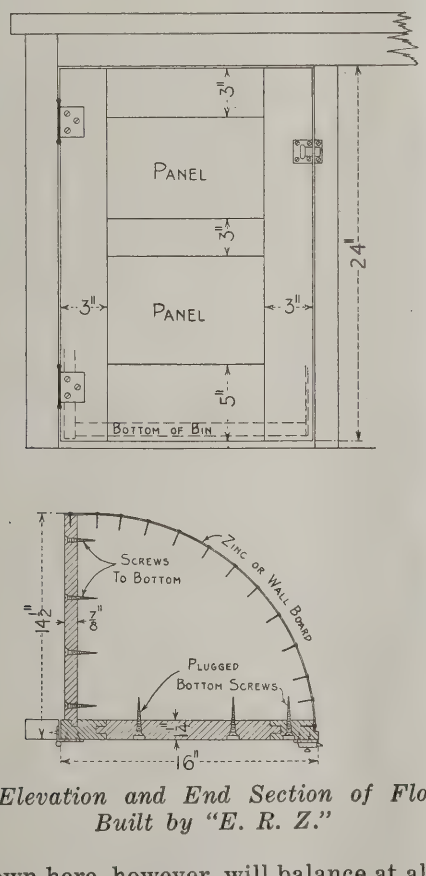
A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

Construction of an Iceless Refrigerator

From H. M., Centralia, Wash.—Are there any readers of the paper who can give me an idea of the construction of what is known as the iceless refrigerator? I expect to build some of these this fall and want to know if there are two pipes in them, one an intake and one an outlet? Should both pipes enter at the top? Any information on this subject will be greatly appreciated by me.

Details of a Flour Bin

From E. R. Z., Sargent, Neb.—In reply to the request of "O. R. H.," Sedalia, Alta., I am sending sketches of a flour bin which I built in my house and which I find a lot handier than the tilting kind, as it is almost impossible to make one that will balance when full and also when empty. The one shown here, however, will balance at all times, as the reader will understand that it opens like a door.



Front Elevation and End Section of Flour Bin Built by "E. R. Z."

The parts on which the door is hinged must be solid and the door must be well made and hung with not smaller than 3 x 3-in. hinges. The dimensions I have here given will hold 50 lb. of flour and provide room for rolling pin, sifter, etc. As stated above, I find this style of bin to be much better than the tilting kind or those that roll out on the floor. The first is hard to balance and the second pulls hard when full.

The circular part, as shown in the end view, can be made of zinc or tin, but the best material is wall board, which can be obtained at almost any lumber yard.

Formula in Design of Beams

From E. A. C., Albany, N. Y.—As a subscriber of *The Building Age* I am greatly interested in the serial article by Mr. McCullough entitled "Design of Beams, Girders and Trusses." In that article the author gives the formula

$$M \text{ (or } M_b) = PL + \frac{WL}{2}$$

Then in the example which he gives to show the application of the formula, he uses

$$WL\ (500 \times 10.5) \text{ instead of } \frac{WL}{2}\left(\frac{500 \times 10.5}{2}\right)$$

Should not the latter be used since he states that the center of gravity for a uniformly distributed load is at the center? The way I figure it out the formula should read

$$M = PL_1 + \frac{WL}{2}$$

in which

$$P = 400$$
$$L_1 = 75'$$
$$W = 50 \times 10 = 500 \text{ lb.}$$
$$L = 10.5'$$

substituting

$$M = 400 \times 7.5 + \frac{500 \times 10.5}{2}$$
$$= 3000.0 + \frac{5250.0}{2}$$
$$= 3000 + 2625$$
$$= 5625 \text{ foot pounds.}$$

I would like very much to have Mr. McCullough enlighten me on this point as the formula and example do not seem to agree and I want to know just what I do not understand.

Answer:—Your correspondent is right and I thank him for calling attention to the error. No excuse for it can be offered and I will take the greatest of care to avoid similar errors in the rest of the articles to appear in this series.

Ernest McCullough.

Some Comments on Questions in the Correspondence Department

From R. W. W., Dayton, N. Y.—To my mind the most interesting pages of *The Building Age* are those devoted to the Correspondence Department. The young carpenter at the present time is more eager to find out how to properly use his steel square to frame a building containing hips, valleys, jacks and braces, than he is to read of some matter that does not come under the head of carpentry work. The high-flown language and long words these articles contain do not help him much for the reason that he is not sufficiently far advanced to understand them or in any event has not the education he should possess. The trouble with many text books is that the writers give a general idea of the work but do not go to the beginning and present the details plain enough for the average man to understand or apply them.

Of all the drawings of roof framing which have appeared in *The Building Age* the method of George H. Wilson, Denver, Col., I like the best. I have used the one in the July, 1913, issue and find that it figures out the same as the figures on the square. I wish some time Mr. Wilson would explain more fully in regard to the method for unequal pitches which appeared in the issue for September of last year.

I live in a small village near Gowanda, which has 3000 population and some good buildings, the largest glue factory in the world, and nearby are the State Indian School, the State Insane Hospital and Buffalo City Tuberculosis Hospital. As building operations are slow in this section this summer, I have had much opportunity to study and observe the mode of builders and to note buildings as far back as 100 years, for many houses are even older than that. In a trip across the Indian Reservation one will see scores of stone houses and fences as well as any number of genuine log houses, while the relics of stone and wood the Indians themselves possess are countless.

In the farming sections on isolated roads are many old houses; nearly all have the rafters cut plumb with old-fashioned cornices and a return connecting the raking and horizontal moldings. As these moldings were worked out by hand and fitted tight at the eaves I could not see their purpose unless it be for an ornament on the building.

The garrets of some of these old houses contain pieces of furniture which the curio collector would highly prize. One time I saw a man who was moving to another neighborhood destroy a large black walnut bureau, the sides of which were at least 16 in. wide. He did not have room for it where he was going and being ignorant of the wood of which it was made he burned it on a pile of rubbish. When fished out of the fire it was beyond repair.

Years ago there was considerable black walnut and cherry around here and after building a house the old-time carpenters would make most of the furniture out of these woods and they were certainly skillful in dovetailing and blind nailing the various parts together.

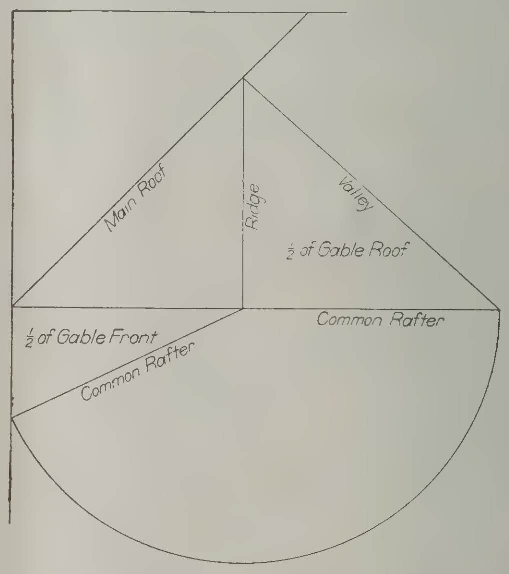
In closing these somewhat lengthy comments I desire to say just a word to "J. H. V." of Sioux Center, Iowa, who states that the rods for his veranda floor are 3/8 in. placed 5 in. apart. These rods placed lengthwise and crossways 5 in. apart are ample to hold the floor of cement. Heavy steel wire will also do the trick. No doubt he knows that a wall built of brick, cement or cement blocks and extending all around the veranda and the center filled in with cinders and grout and then the finish floor on top of this, is a good way to do the work.

Treating Moisture from Plastered Walls

From F. McK., St. Louis, Mo.—Will some of the practical readers who have had experience in similar cases tell me through the Correspondence columns of a satisfactory method of treating moisture from plastered walls. About two years ago we had a cottage plastered during freezing weather and the contractor added a considerable quantity of salt before applying. We are now troubled with the sweating of the walls during each rainstorm or during damp weather. If any one can tell us how to remedy the difficulty it will be greatly appreciated.

Drafting with the Steel Square

From F. G., Lisbon, N. D.—I am sending a diagram which may possibly help "W. X. Y. Z.," Westfield, Mass., to solve his problems of obtaining bevels for gables to be planted on the slope of main roof merely for appearance sake from the outside. I have built many small gables and even dormers complete with cornice all ready for shingling and did it all on the floor. When finished I pulled them up to the roof and spiked them in position.



Drafting with the Steel Square

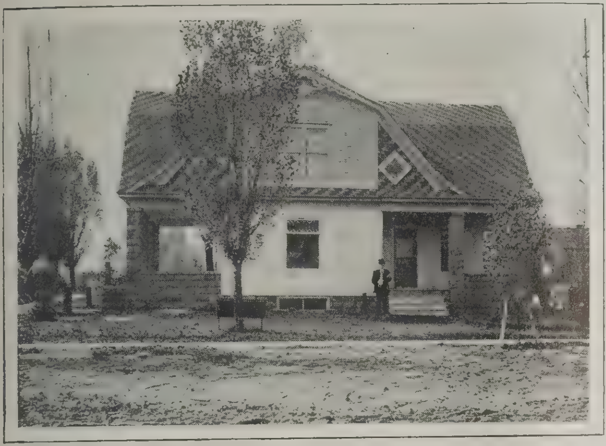
Deadening a Floor

From Builder, Clinton Co., N. Y.—In answer to "W. A. K.," Toronto, Canada, who asked on page 49 of the July issue regarding a good method of deadening a floor, I would say that mortar will serve to load the floor and conduct the noise. In order to do good work the correspondent should take up the original floor, nail strips on the sides of the joists, then put in a false floor of thin stuff

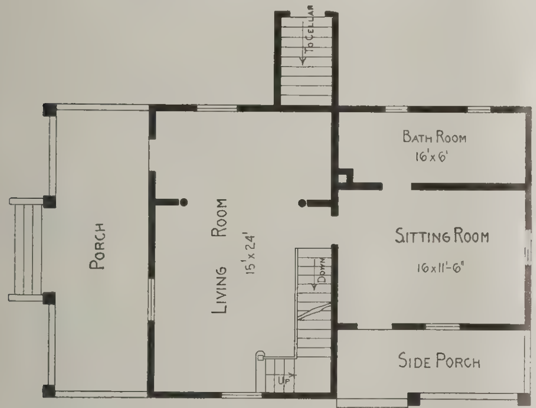
2 in. or 3 in. above the steel ceiling and cover this with 3 in. or 4 in. of cotton silicate.

A Remodeled Dwelling

From N. H. Nelson, Grayling, Mich.—I am sending photographs and plans of a house which I remodeled from an old one-story structure a little more than a year ago. It will be seen that the kitchen and dining room are in the basement and directly over this on the main floor is a large living room from which rise the stairs to the second story and under them is the flight to the basement.



A Side View of the House Showing Porch Treatment



First Floor Plan—Scale 1/16 In. to the Foot

Originally the bath room was a side porch but in order to utilize the room back of the stairs I built the outside wall flush with the end of the front portion, and then made the sitting room to open on to the side porch where shown on the plan.

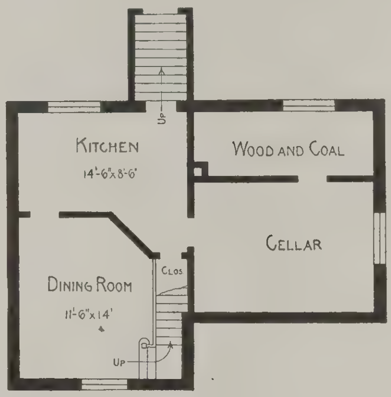
On the second floor are three sleeping rooms with ample closets and a "den," the latter being lighted by the double window in the front gable.

The piers and porch enclosures at front and side of the house are of rock face cement blocks the same as the foundation walls. The outside walls and gables of the house are covered with siding, while the roof effects are obtained by the use of red and green colored asphalt shingles made by the H. M. Reynolds Asphalt Shingle Co., Grand Rapids, Mich.

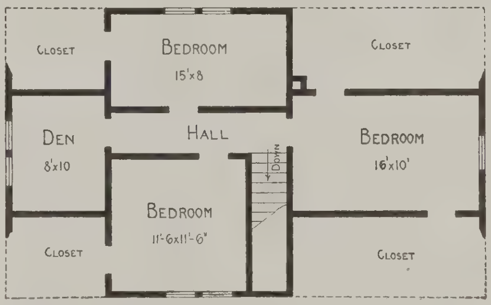
Some Comment on Stucco Houses

From C. K., West New Brighton, N. Y.—Having become a subscriber to *The Building Age*, I noticed on page 31 of the July issue a short article entitled "Comparative Cost of Frame and Stucco Construction." Having built a stucco house myself in the old way; that is, siding on studs, Neponset damp-proof paper fastened with mason lath and Steelcrete over this with stucco, I would like to know whether the construction mentioned in the article in question—metal lath fastened directly to the studding with stucco over it—has proved by experience to be in every way satisfactory?

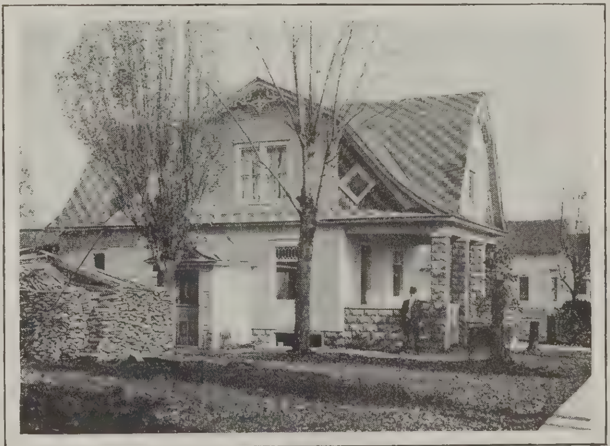
Would there be any danger of dampness and is the fastening directly to the studs—16 in. on centers—sufficient for the weight of the stucco?



Basement Plan—Scale 1/16 In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot



View of Front and Left Side Showing Entrance to Kitchen and Dining Room

A Remodeled Dwelling—N. H. Nelson, Builder

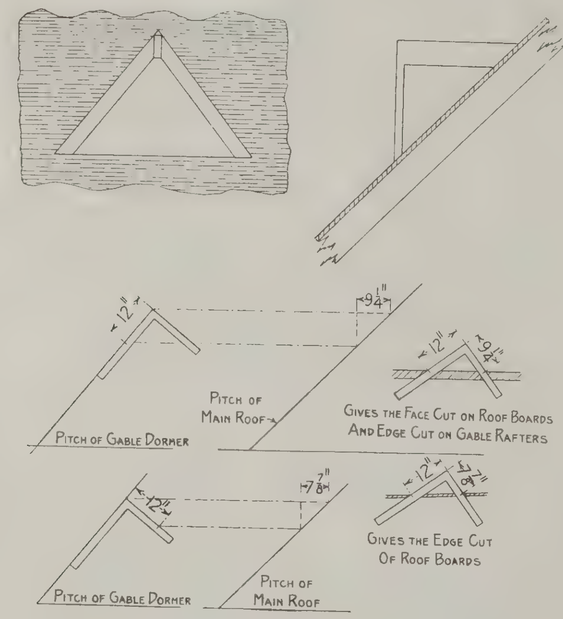
Since I am not a builder but want to build more stucco houses, I would like this question to be discussed by a competent architect or builder in the next issue of the paper if possible.

Answer—There is no danger of dampness with proper workmanship and a good way to secure tightness of walls is to back plaster the outside; that is, when the studding, which should preferably be metal, is in place, wire the outside lath to it and plaster on both sides of the lath, the inside coat, of course, to be between the studding. The inside lath is then securely fastened in place and the plaster applied. If care is used in purchasing the lath a spacing 16 in. between studding will be all right. No lath lighter than 24 gauge should be purchased. The builder must make sure that he is obtaining the right gauge and this can be done by weighing, the 24 gauge weighing not less than 3.4 lb. per square yard, plain. If painted or coated with some preservative coating the weight is increased about ¼ lb. for paint and ⅞ lb. for galvanizing. It is advisable—in fact necessary—to use painted or galvanized lath if the plaster contains gypsum.

Ernest McCullough.

Obtaining Cuts of Gable Rafters

From E. H., Mount Vernon, N. Y.—The accompanying sketches are sent in answer to the query of "W. X. Y. Z.," Westfield, Mass., in a recent issue of the paper. The correspondent will observe from a careful inspection of these sketches that they represent a very simple way to solve any problem in roof framing.



Obtaining Cuts of Gable Rafters—Sketches Submitted by "E. H."

Laying a Cement Roof

From A. P., Elgin, Iowa.—I have been a subscriber to *The Building Age* for some time and take this opportunity of stating that it has been a great help to me. I have not before come to the Correspondence columns for information, but I am now in need of some help which I trust the readers will be free to furnish. I would like to have some of those with practical experience in cement roofing tell me how to put a roof of this kind on a spring milk house which is 8 x 10 ft. in plan and 7 ft. high. The spring house itself is of concrete and I was thinking of putting on a hip roof. How would practical men frame a roof of this kind to receive the cement coating and of what proportions should the mixture consist?

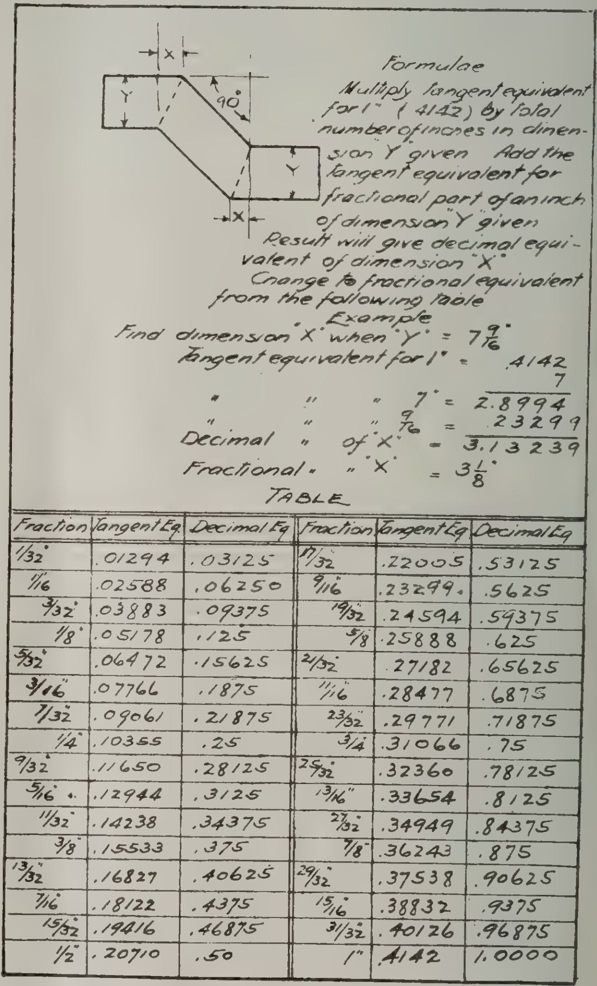
Should sheathing be put on or should the wire netting be placed directly on the rafters?

I was intending to make the roof 6 in. rise per foot run, although it can be made steeper if necessary. I might state that the object of putting on a cement roof is to prevent the rays of the sun from penetrating and keep the interior of the building as cool as possible.

Table of Bevels

From F. E. King, Youngstown, Ohio.—I am enclosing a blue print taken from my note book which may help some of the readers of the paper in laying out walks or counter tops.

I enjoy reading *The Building Age* very much and while I have not subscribed for it, still I do not allow a month to slip by without securing a copy of it from the news stand.



Formulae

Multiply tangent equivalent for 1" (.4142) by total number of inches in dimension Y given. Add the tangent equivalent for fractional part of an inch of dimension "Y" given. Result will give decimal equivalent of dimension "X". Change to fractional equivalent from the following table

Example

Find dimension "X" when "Y" = $7\frac{9}{16}$"

Tangent equivalent for 1" = .4142
7
" " " 7" = 2.8994
" " " $\frac{9}{16}$ = .23299
Decimal " of "X" = 3.13239
Fractional " " "X" = $3\frac{1}{8}$"

TABLE

Fraction	Tangent Eq.	Decimal Eq	Fraction	Tangent Eq	Decimal Eq
1/32"	.01294	.03125	17/32"	.22005	.53125
1/16"	.02588	.06250	9/16"	.23299.	.5625
3/32"	.03883	.09375	19/32"	.24594	.59375
1/8"	.05178	.125	5/8	.25888	.625
5/32"	.06472	.15625	21/32"	.27182	.65625
3/16"	.07766	.1875	11/16"	.28477	.6875
7/32"	.09061	.21875	23/32"	.29771	.71875
1/4"	.10355	.25	3/4	.31066	.75
9/32"	.11650	.28125	25/32"	.32360	.78125
5/16"	.12944	.3125	13/16"	.33654	.8125
11/32"	.14238	.34375	27/32"	.34949	.84375
3/8"	.15533	.375	7/8"	.36243	.875
13/32"	.16827	.40625	29/32"	.37538	.90625
7/16"	.18122	.4375	15/16"	.38832	.9375
15/32"	.19416	.46875	31/32"	.40126	.96875
1/2"	.20710	.50	1"	.4142	1.0000

Table of Bevels submitted by F. E. King

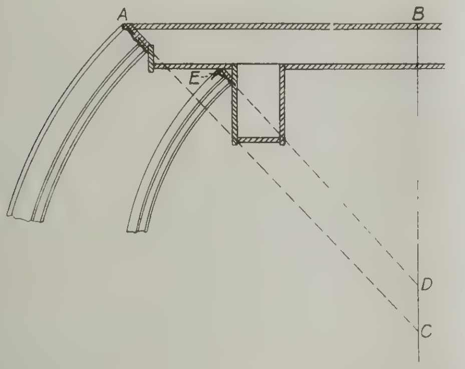
Problem in Porch Construction

From D. C. H., Buckhannon, W. Va.—In the April issue of the paper, page 60, "C. U. F.," of Ong, Neb., wants to know how to spring a molding around a circular cornice without breaking it. I would say that it is not practical to use a straight mold for the purpose indicated, but the problem can be solved in a workmanlike manner, as shown by the enclosed sketch and the instructions accompanying it.

Referring to the sketch *A-B* is the radius of the porch and *B-D-C* a line of indefinite length perpendicular to A-B. Draw a line through the center of the crown mold and extend it until it cuts the line *B-C* at the point *C*. Use *A-C* as radius to lay out stock for moldings as shown in the sketch. Draw a line through the bed mold or any other splayed mold used around circular work and extend it to cut the line *B-C;* then with *D-E* as radius lay out the stock as described above.

After the stock for molding has been cut out the mold can be worked on any universal woodworker or jointer arranged to use extra cutters. In working the mold it is necessary to use a form or guide to keep the stock in position while being worked. Cut kerfs in the back of the mold to a uniform depth close together and point toward the center from which the lines of the stock were drawn. A molding can be made to spring into a concave surface, but more care must be used in springing it into position.

In this connection I would mention that in the issue of the paper for May, 1904, it was known as *Carpentry and Building,* I answered the same question for the benefit of "U. G. K.," of Harlan, Iowa.



Problem in Porch Construction as Submitted by "D. C. H."

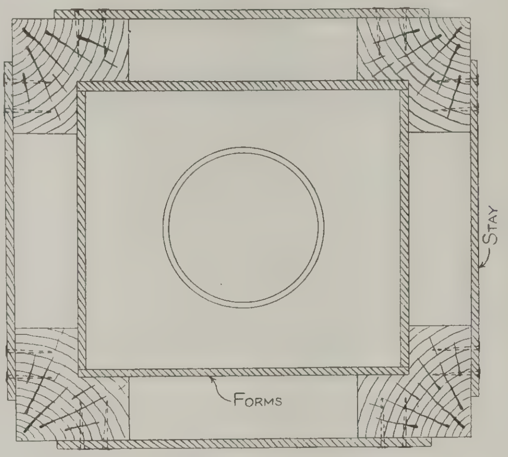
From D. P. B., Redford, N. Y.—If "C. U. F.," Ong, Neb., will steam his molding until it will bend like a hoop he will have no trouble in building the corner of his porch the way he wants it.

Some Questions on Floor Construction

From H. M., Centralia, Wash.—Will some of the practical readers of the paper kindly answer the following questions on construction? How do they estimate the cost of solid flooring, say 2 x 4 in. on edge and 2 x 6 in., and so on? Also, its carrying capacity and the quantity that a man can lay in a day of eight hours? How would they figure the waste in such cases?

Construction of Cobblestone Chimneys and Foundations

From D. P. B., Redford, N. Y.—The inquiry of "C. A. L.," Monroe City, Mo., and printed on page 55 of the July issue furnishes a fine illustration of indefiniteness. Does the correspondent want to lay the stones with a trowel, giving rustic effect or in cement as boulder concrete? Forms must be used in either case according as the work goes on, setting the face of each stone against the form and placing mortar around it with the trowel, but do not allow the mortar to come within an inch of the forms.

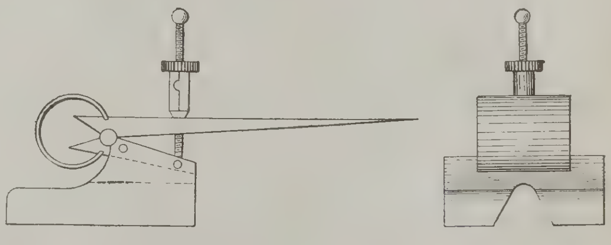


Construction of Cobblestone Chimneys and Foundations

For chimney work he may set up forms as indicated in the accompanying sketch and place the boards as he goes up. Stovepipe will answer for the inside forms. If he does not want a straight shaft he can set up the corner posts in sections. The bottom ends, however, must be cut to fit the roof. If these stones are to be used in concrete a board should be used between the stones and the forms. After setting for half an hour the board may be removed and its place filled with a 1:1 mixture of cement and sand. Oiling the boards with "Maltha" will prevent the cement sticking to the forms, and it should be used to make the mortar in the chimney waterproof.

A Diminutive Scribing Block

From R. W., Stamford, Ont., Canada.—A small scribing block for very fine work is sometimes much in demand by the practical mechanic and the device can be made by cutting one leg of a pair of dividers and setting it in a block as indicated in the accompanying sketches, one of which represents a side view and the other an end view. The device can be adjusted and held in place with one hand.



A Diminutive Scribing Block

◆

A sawmill of American make, with a capacity of 60,000 board feet a day has been erected on the South coast of Mindanao Island, Philippines.

◆

The Minneapolis city council has recently passed an ordinance limiting the hight of buildings; and under it skyscrapers will hereafter be limited to 175 ft. in hight, or twelve stories.

The Great Palace of Horticulture

This Will Be One of the Features of the Panama-Pacific Exposition Having Largest Glass Dome in the World

FROM a structural standpoint the great palace of Horticulture, with its immense crystal dome, the largest now in existence, is probably the most interesting of any of the buildings at the Panama-Pacific Exposition. Both on account of its size and the excellence of its design this structure is attracting much attention.

The dome is visible miles from the exposition grounds. At night it will seem like a giant soap bubble, being illuminated by giant searchlights playing on the glass from within.

Style of Its Architecture

Flanking the main entrance at Scott Street, the dome will share honors with the dome of the Festival Hall to the right and the Tower of Jewels immediately in front. It is Saracenic in composition but the detail and ornament are more of the 18th Century French Renaissance.

The wooden trellis work, forming a distinctive feature in the decorative scheme, is derived from the garden architecture of the Louis XIV period in France, which with the large areas of glass, suggests the purpose of the structure.

The building is 660 ft. long, 300 ft. wide, and 185 ft. 6 in. high to the top of the main dome which is 152 ft. in diameter, or approximately the same as the Pantheon at Rome.

The rear portion of this Palace is the main exhibit space. The floor consists of 2 in. shiplap on 2 x 6 in. joists spaced 2 ft. on centers. The joists in turn are supported by 3 x 4 in. sleepers imbedded in the ground and approximately 6 ft. 8 in. on centers. The floor is designed for 100 lb. live load per square foot. In the front part of the building there is no floor except in the aisle portions. The frame of the rear portion of the building is of wood and is carried on ordinary wooden spread footings. The heavy concentrated loads in the front part of the building are carried on piles.

Dimensions of Dome

The dome of the building may be described as an immense half-sphere with a diameter of 152 ft. supported by a cylindrical shaft of the same diameter and with a hight of 25 ft. This cylindrical shaft is in turn supported by means of deep plate girders and trusses framing between eight structural steel piers of 65 ft. hight.

An idea of the magnitude of this dome may be had when it is compared with some of the most famous domes now in existence. The diameter of the Pantheon of Rome was 142 ft.; that of the Duomo of Santa Marie del Fiore at Florence, 139 ft.; United States Capital, Washington, D. C., 135½ ft.; while the famous dome of St. Peter at Rome is 139 ft. in diameter.

Rising from the top of the hemisphere is an architectural staff *motif* in the form of an immense flower basket. The frame of the dome is composed of 24 steel ribs connected by 11 horizontal rings; between these rings are framed 4-in. I-beams, termed jack rafters. The bays formed between the ribs and rings are braced throughout with diagonal steel rods. Each of the above ribs is 36 in. deep and is composed of two chords laced together by light steel angles. The outer chord is built of two 4 x 4 in x 5/16 in. angles while the inner chord is made up of 2-3-in. x 3-in. x 5/16-in. angles. The size of the lacing angles is 2½ in. x 2 in. x ¼ in. As designed the outside chord of these ribs is carrying all the load of the dome; the inner chord coming into play only to resist bending due to the curved shape of the ribs. The rings are of the same detail as the ribs except that their depth is less and their sections smaller; also as in the case of the ribs the outside chord consisting of 2-5-in. x 3½-in. x ⅜-in. angles is carrying all the direct stress, the inner chord taking only the indirect stresses due to bending. The function of the rings is to prevent distortion of the ribs.

Action of Dome in Carrying the Load

The action of this dome in carrying its load may be described as follows: The weight of the glass is transferred by the purlins and jack rafters directly to the outside chord of the ribs which also receives the weight of the staff basket. The load in the ribs tends to bend them in the plane formed by the two chords, the bending being sometimes outward and sometimes inward. This bending is resisted by the rings which act as ties when the tendency to bend is outward and as struts when the tendency is to bend inward.

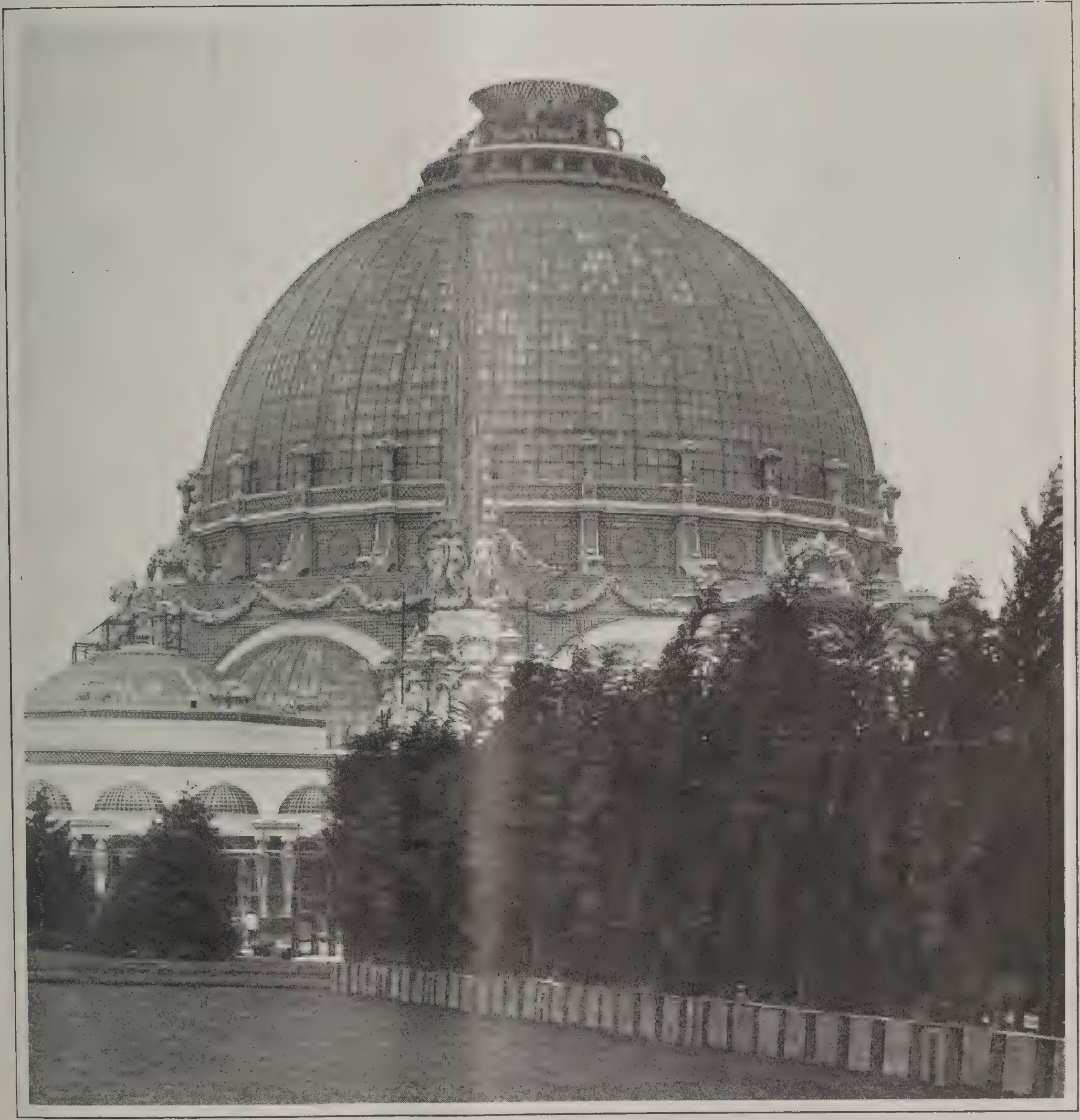
In the design the rib is considered as being composed of a series of short struts, the length of these struts being that of the panel formed by any two adjacent rings. Since the outer chord of the ribs is curved instead of straight, as is assumed in the design, there is a marked tendency of this outer chord to bend and this secondary bending is provided for by lacing the outer chord (horizontally) to the inner, thus bringing both chords into action to resist this distortion.

If there were no other loads tha nthe actual dead loads there would be no occasion for any diagonal rods. However, to provide for the action of wind it is necessary to break all the bays which are in the shape of a quadrilateral into triangular frames. Since a rod can take only tension it is necessary to provide two rods in each bay.

When the whole of the structure just described is riveted together and the rods tightened, the frame though light and airy in appearance has a great stiffness, considering the small size of its sections.

The supports of the dome have been described as consisting of plate girders, trusses and structural steel piers while the substructure may be more completely described by noting that each of the eight piers is in the shape of a trapezoid, at each corner of which is a steel I-beam column 65 ft. in height. This trapezoid has two sides normal to a radius of the dome passing through its center, the inner side being the shorter, with these two columns spaced a distance apart of 4 ft. 6 in. The outer of these two sides has its two columns spaced 15 ft. 10 in. on centers. The inner columns are built of 20-in. 59-lb. I-beams reinforced by plates and have their flanges laced together with 5-in- x 3-in. x 5/16-in. angles.

The outer columns are built of 2-8-in. 55-lb. I-beams. These outer columns are laced to each other and to the two inner columns by means of latticed struts and diagonal rods. Between the inner columns of each pier is framed a plate girder 6 ft. 4½ in. deep and 57 ft. 6 in. long. The web plate of this girder is 5/16 in. thick and has two flanges, each consisting of 2 ft. 6 in. x 7/16 in. angles with one cover plate 14 in. x ⅜ in. x 28 in. long. On these plate girders rest directly the ribs of the dome. Between the outside columns of each pier are framed steel trusses which support the flat roof surrounding the base of the dome. Into these trusses also frame the steel ribs of the eight small half-domes which connect into the wall under the large dome.



The Great Palace of Horticulture at the Panama-Pacific Exposition, Having as One of Its Structural Features the Largest Glass Dome in the World

The top and bottom chords of plate girders and trusses are laced horizontally with angle struts and diagonal bars, to provide a stiff horizontal ring around the base of the dome.

To secure all the stiffness possible in the framing of the dome all connections are riveted. This is equivalent to doubling the strength of the dome over that figured in the design. However, since this building is a temporary one and must be removed at the conclusion of the exposition the remainder of the steel connections were made by bolted connections.

The steel frame rests upon a timber grillage supported by piles. The weight of the steel in the superstructure or the dome proper which consists of all the structure above the level of the top of the plate girders is 200 tons. The surface area of this portion is 47,000 sq. ft. so that the weight of the steel in the dome proper is 1,317,000 cu. ft., making the weight of steel per cubic foot 0.304 lb. The weight of steel in the substructure or that portion of the steel frame below the level of the top of the plate girders is 300 tons, making a total weight of steel in the frame 500 tons.

Method of Erecting the Dome

The cubical contents of the volume enclosed by the steel frame is 2,817,00 cu. ft., giving an average weight of steel per cubic foot of 358 lb. The cost of the steel erected was approximately $55,000.

In erecting this dome a wooden tower was constructed in the center of the projected base of the dome. The top of this tower was at an elevation slightly higher than the top of the plate girders. Upon this tower was erected one guyed mast with two guyed derricks. The top ring of the dome into which all the ribs frame was suspended from the mast by means of angles arranged with turnbuckles so that the position of the ring could be adjusted to a nicety. Meanwhile on the ground the ribs were assembled in pairs and each two ribs framed together with their rings and diagonal rods and all riveted together. The two ribs were then erected as one piece, being swung into place by the derricks. The weight of one pair of ribs thus connected together was approximately eight tons.

The Cost of the Building

It would probably be interesting to record the construction cost of this building and there follows an itemized statement of the cost taken from the latest compilation of estimates.

Furnishing steel frame, Contract 143, Dyer Bros...	$43,513
Erecting steel frame, Contract 158, Dyer Bros.....	11,115
Pile driving, special contract, Healy Tibbitts Co...	2,311
General construction, Contract 159, John Monk....	208,658
Plumbing, Contract 183, Wittman, Luman & Co....	3,992
Hot water heating, Contract 184, Turner Co.......	5,775
Boiler house, Contract 207, John Monk............	2,215
Fumigating building, Special Contract 242, John Monk	1,047
Lumber, 2,524,244 board feet furnished by the Exposition	36,042
Electric wiring, estimated cost..................	18,000
Additional plumbing and heating required, estimated cost	5,000
Decorative painting, estimated...................	5,000
Interior cold water painting and painting of steel, estimated	3,000
Incidental additional requirements...............	14,332
	$360,000

The total area of this building is approximately 201,000 sq. ft., which indicates that the entire building will cost the exposition the sum of $1.72 per square foot of floor area covered.

The architects were Blakewell & Brown, of San Francisco, who made the studies and prepared the architectural design for the building. The timber portion of the building was designed by C. H. Snyder, consulting engineer, acting for the Division of Works, and the design of the steel dome carried out by the engineers of the Division of Works.

Placing the Responsibility for Statements in Specifications

The discussion of contract provisions oppressive to contractors has received a valuable addition from the U. S. Supreme Court in its recent opinion in the case of Hollerbach & May, where William B. King, a member of the National Association of Builders Exchanges, successfully represented the contractors. The government called for bids for repairing an old dam on the Kentucky River. The specifications stated that the old dam was backed with broken stone, sawdust and sediment. When the contractors did the work it was found to be backed with sound cribwork filled with stones, and the removal of this cost more than would the removal of broken stone, sawdust and sediment. The contractors therefore sued for this difference.

The government relied for its defense on general cautionary clauses in the specifications saying that bidders must visit the locality, make their own estimate of all difficulties and contingencies, ascertain the nature of the work and obtain the information necessary for an intelligent proposal. The contractors maintained that they were excused from doing this in regard to the backing of the dam because the specifications told them exactly what would be found there and that they had a right to rely upon the statements on that subject in the specifications.

The Court of Claims agreed with the government's contention. The Supreme Court took a view more liberal to the contractors, stating that the specifications unequivocally asserted what would be found behind the dam and that the contractors had a right to presume that the government spoke with knowledge and authority. Among other things the court said: "We think this positive statement of the specifications must be taken as true and binding upon the government, and that upon it rather than upon the contractors must fall the loss resulting from such mistaken representations." Accordingly judgment was given against the government for the excess costs incurred by the contractors.

This decision is of general importance because many contractors, particularly for foundation work, sewers or plumbing, sign contracts stating particular facts in positive terms. When more costly conditions are found to exist the contractors are told that these representations of facts are not binding on the owner because somewhere else in the specifications the contractors are told to be on their guard against everything. This decision of the Supreme Court answers this contention. It says that the contractors have a right to assume that positive statements in the specifications are true and if not true that the burden does not fall on the contractor, but on the owner—the government, the municipality or the individual, which has misrepresented the facts.

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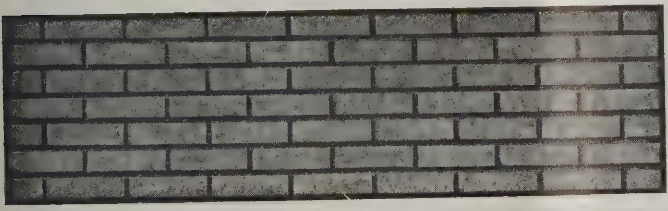
It is stated that lumbermen and others have shown recently that only 40 per cent. of the trees cut in the forests of this country are used for lumber. In Germany about 95 per cent. of every tree grown in the forests is used, thus allowing practically nothing to go to waste.

Bonds and Mortars in Brick Walls*

Difference Between Bond and Pattern — Numerous Examples with Brief Description of Their Characteristics

DESIGN in brickwork is based on an accurate knowledge of the mechanical processes of the bond. Bond may be defined as the method by which each brick in the wall is so placed that the entire wall, by the overlapping of the individual bricks upon each other, forms one solid mass throughout its length and breadth. The bricks laid with the length of the wall, or the stretchers as they are called, secure by their overlap longitudinal bonding strength, while those laid across the width of the wall, or the headers, bond the wall transversely.

As a pure Running Bond, or one made up entirely of stretchers, provides only for longitudinal strength, we may be justified in saying that all structurally sound brickwork is based on either one of two methods of bonding, both of which systematically include headers with the stretchers throughout the courses. The first is known as English Bond, and consists of alternating courses of headers and stretchers. The second is the Flemish Bond, consisting of alternating headers and stretchers in every course, so arranged that the headers and stretchers in every other course, respectively, appear in vertical lines. All ornamental bonds are simply variations of these two fundamental forms.



Bonds and Mortars in Brick Walls—Fig. 1—A Good Example of a Running or Stretcher Bond

It is essential, however, that the designer of ornamental brickwork should be cautioned not to confuse bond and pattern. Bond refers primarily to the arrangement of the bricks as they overlap each other from course to course. It is true, bond may be frequently used to make various patterns by this arrangement; but, in the strict sense of the term, pattern refers to the change, or the varied arrangement, of the brick texture or color used in the facing; so that in this way it may be possible to secure many patterns in identically the same bond. Pattern may also be produced by the handling of the mortar joint, or by the projection or recession of certain bricks from the plane of the wall—a form of pattern used especially in the Moorish and Spanish brickwork.

Running or Stretcher Bond, Fig. 1, consists entirely of stretchers overlapping each other one-half brick; that is, breaking joint evenly, with the vertical joints in alternate courses forming perpendicular lines. Obviously lacking inherent transverse strength, this bond is suitable for use in wall facing only, which must be tied to the backing by some artificial means.

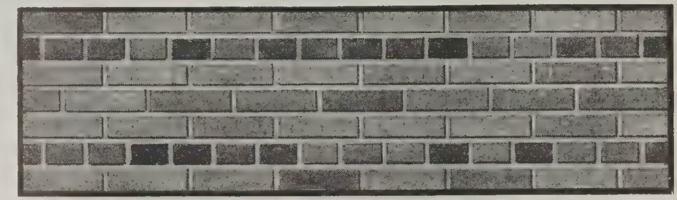


Fig. 2—Showing Construction of Common Bond

To remedy the transverse weakness of this bond, a header—sometimes a Flemish—course is introduced at regular intervals, generally every sixth or eighth course, resulting in what is known as Common Bond, Fig. 2 shown with three intervening courses, which affords a perfectly satisfactory bonding strength in the wall transversely as well as longitudinally.

Another form of Running Bond is given in Fig. 3. Here the stretchers overlap only a quarter brick, or are crossed one-half instead of being wholly crossed, as in Fig. 1. This bond is very rarely used for any large surface, but frequently occurs in two or three courses separated by a Flemish or a header course approaching in its nature the Common Bond.

Fig. 4 shows a running Header Bond worked by the brick texture or color as a zigzag. In Fig. 5 we have headers laid without any bond at all in vertical lines, producing a reticulated appearance and forming what is known as Checker-Board Bond. Although it is sometimes used in wall surfaces, it is merely ornamental and does not strictly come under the definition of bond. It should properly be used only in panels or contained areas.

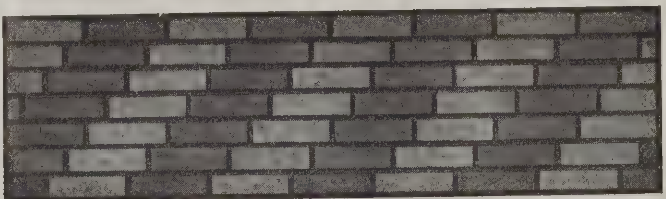


Fig. 3—Another Form of Running Bond

English Bond, Fig. 6, already mentioned as one of the two basic methods of bonding, consists of alternating courses of headers and stretchers, with headers centered on the stretchers which lie in vertical lines. The tinting of the illustration shows two possible patterns which may be obtained by change in color or texture of the brick. English Bond presents serious practical difficulties in case two headers with the mortar joint, as may frequently happen, occupy a greater space than the length of the stretcher, thus making it exceedingly difficult to secure the desired alignment in the vertical joints.

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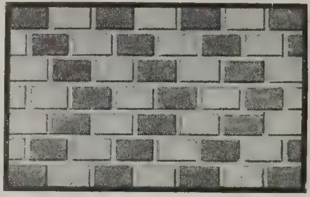
*Reprinted from "Bonds and Mortars in the Wall of Brick" by permission of Hydraulic-Press Brick Company.



Bonds and Mortars in Brick Walls—Fig. 4—A Running Header Bond

English Cross Bond, Fig. 7, referred to by some builders as Dutch or Dutch Cross Bond, is a modification of English Bond, in which the stretchers are crossed; that is, break joint evenly in the successive stretcher courses. The same practical difficulty applies to this as to English Bond. Figs. 6 and 7 are drawn so as to show two headers with the joint as being exactly equal in length to the stretcher. Fig. 7 shows two pattern arrangements which may be made in English Cross Bond, dependent upon handling color or texture.

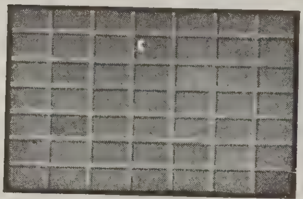


Fig. 5—Checker-Board Bond

Flemish Bond, Fig. 8, already mentioned as the second basic method of bonding, consists of alternating headers and stretchers in all the courses of the wall, and these are known as Flemish courses. There are two legitimate methods of starting the corner in this bond, both of which are frequently used on the same work. The left end of the illustration shows the use of a quarter-brick, or "queen" closer, known as the "clip." The right end shows the use of the three-quarter brick, or "king" closer. There should be no variation in color, however, between the clip, as shown on the left-hand edge and the general wall color of the course. Pattern in this bond should be made only by the headers. The closer at the corners should never be included as part of the pattern.

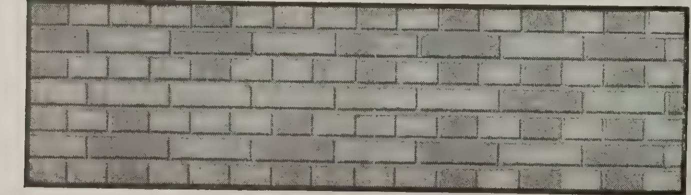


Fig. 6—Showing English Bond

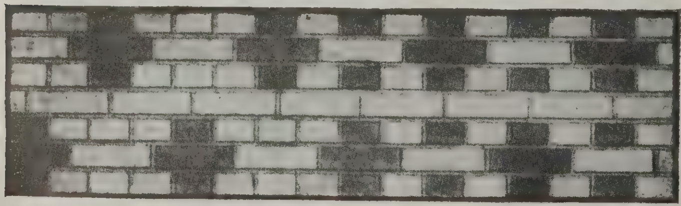


Fig. 7—Showing English Cross Bond

It should be stated in passing that the brick designer must exercise great care in the use of his quarter-brick closer or clip in beginning or ending his courses at corners or edges of openings. He may, without scruple, begin or end his course with a three-quarter brick if necessary, but in case the clip is needed to complete the bond, it should never, except under the most pressing necessity of pattern requirements, be permitted to take the corner. Its best position is next the corner brick, as seen in the left-hand edge of the figure.

Flemish Bond may be modified by doubling the stretchers in every course, as in Fig. 9, and centering the headers over the stretcher joints, which are always concealed or "blind"—in this particular alone differing from a Double-Stretcher Garden Wall Bond, as illustrated in Fig. 15 of the diagrams.

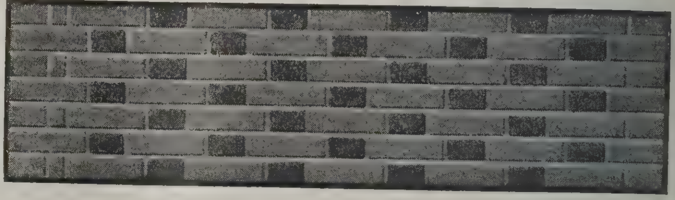


Fig. 8—Showing Flemish Bond

Flemish Bond with its variations is the basis of most pattern bond, which largely depends upon crossing the simple Flemish Bond by first introducing variously crossed stretcher courses between the Flemish courses and then shifting the Flemish header in one of several different ways or allowing it to remain in a vertical line.

Thus in Fig. 10 we have the simplest form of Flemish Cross Bond which consists of alternating Flemish and stretcher courses with the headers in vertical lines and the stretcher courses crossed. In Fig. 11 we have the same arrangement of crossed stretcher courses, but the Flemish header departs from the vertical line by being shifted back and forth its width. This bond is the beginning of all *diagonal* pattern bonds, which owe their variation chiefly to the number and treatment of intervening stretcher courses, and to the way in which the header is shifted. In Fig. 12 a Flemish course alternates with two stretcher courses which have an overlap of a quarter brick and reverse the diagonal direction of their vertical joints after every Flemish course, while the header is shifted back and forth three-quarters of a brick.

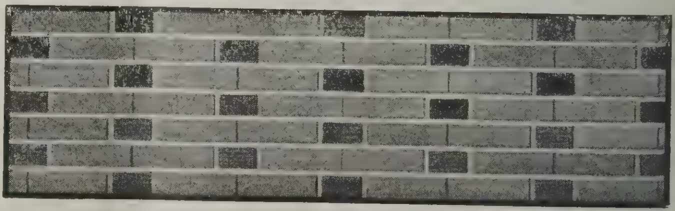
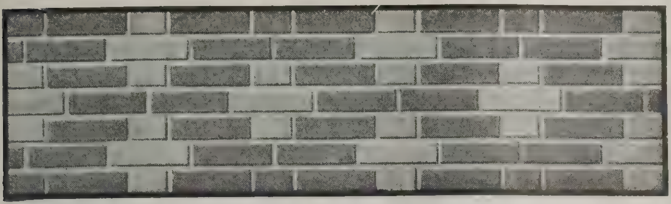


Fig. 9—A Modification of Flemish Bond

Fig. 13 represents a bond in which Flemish courses alternate with groups of three stretcher courses. This is a very satisfactory bond for average brickwork, as the headers are frequent enough to tie sufficiently the facing to the backing brick, and the work can easily be laid out so as to fit average building conditions without any very serious trouble.

Fig. 14 shows a Flemish Spiral Bond, having the Flemish courses laid out so that the headers break joint over each other and form diagonal bands on the face of the wall—a bond that is often used for stair-towers and chimneys.



Bonds and Mortars in Brick Wall—Fig. 10—Simplest Form of Flemish Cross Bond

In Fig. 15 we have Garden Wall Bond, which was originally used in eight-inch garden walls. Its value lies in its longitudinal strength, with sufficient transverse bonding secured by a symmetrical placing of the headers. By this arrangement a wall is laid in which both faces present a like bond surface. The illustration shows the original form of this bond, consisting properly of three stretchers alternating with a header in each course, although it is sometimes laid with two stretchers and a header—then designated as Double-Stretcher Garden Wall Bond—in which case it forms the basis of Double-Stretcher Flemish Bond, as given in Fig. 9. Garden Wall Bond may also be laid with four or even five stretchers between the header.

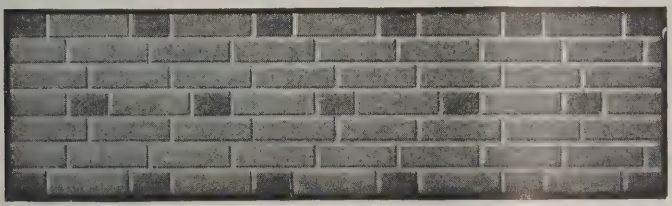


Fig. 12—A Flemish Course Alternating with Two Stretcher Courses

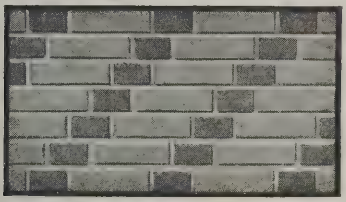


Fig. 14—Flemish Spiral Bond

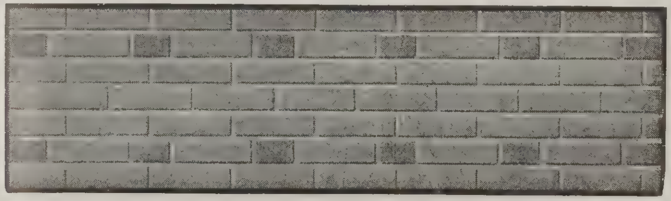


Fig. 13—Flemish Courses Alternating with Groups of Three Stretcher Courses

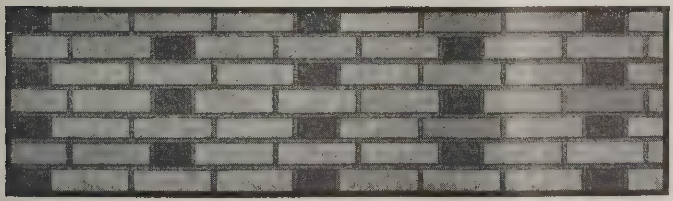


Fig. 15—A Garden Wall Bond

Fig. 16 is a representation of Garden Wall Cross Bond, which consists of Garden Wall courses alternating with stretcher courses crossed. One form of pattern often used in this bond is indicated in the accompanying diagram.

In regard to bond pattern units it may be stated that beginning with Unit 1, which is composed of a stretcher with a header centered above and below it, each succeeding unit is formed by extending every course of the preceding unit the width of a header, always centering the courses on the middle course regarded as the horizontal axis of the unit, and terminating the whole above and below by a header. As a result the units, however far they may be carried out, always present exact mathematical proportions and bear a definite relation to each other. The serial number of any particular unit may at once be known by subtracting one from its number of courses and dividing by two; or more simply by counting the number of courses either above or below the horizontal axis. Conversely the number of courses in any given unit may be known by doubling its serial number and adding one.

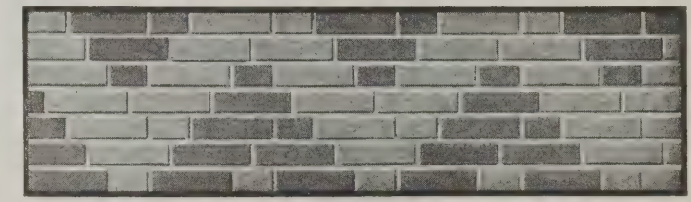


Fig. 11—The Beginning of All Diagonal Pattern Bonds

Thus, if we discover in a brick wall a unit of 19 courses—nine courses on either side of the horizontal axis—we should know that it was Unit IX, or if we wished to use Unit IX we should always be obliged to have spaces for 19 courses; and so on to the end of the chapter.

The designer in brickwork is urged to remember that the use of pattern bonds obligates him to pay the strictest and most thoughtful attention to the beginning and ending of the pattern, either at the bottom or top of the structure or on piers as they occur separately or between windows. He must first decide on a unit which is suitable to the size of the panel to be covered and then exactly center it upon the panel so that his pattern may end in a symmetrical manner both laterally and vertically.

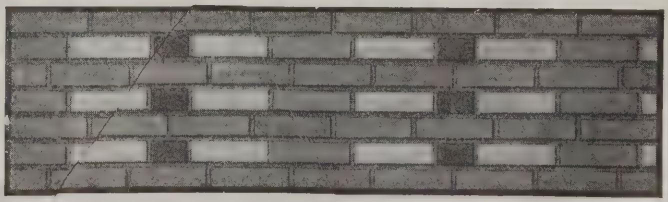


Fig. 16—A Garden Wall Cross Bond

(*To be continued.*)

Two Cottages of English Design

Examples of Moderate Cost Construction Which Are Well Adapted to Meet Rural Requirements

THE subject of cottage design is one of almost never ending interest, and the many plans which are constantly being published attract widespread attention. Much has recently been said in the English architectural papers about rural developments and cottage housing for the working classes, as well as those in somewhat more comfortable circumstances, and upon the facing page we present pictures with plans of two cottages which in style and character are fairly typical of a series which have recently been erected at Otford, near Sevenoaks, in Kent, England.

It is interesting to compare the layout of a typical English cottage plan with the scheme which prevails in this country, although, of course, account must be taken of the differences in local conditions and family customs. In the English system it appears to be customary to designate what we call the first floor of a house as the "ground floor" and our second story rooms are designated as "first floor."

In the lower cottage shown on the facing plate there is a commodious and well-lighted hall extending practically through the center of the cottage, the main flight of stairs rising from a point well toward the rear. To the left of this hall are parlor and living room, while to its right is a study and a kitchen. Beyond the kitchen is the wash house or "scullery," which opens to the yard, with its coal bin and toilet. The bathroom is on the main floor and immediately adjoins the scullery, thus concentrating the plumbing fixtures. On the second floor are four bedrooms and a dressing room.

The cottage shown on the upper part of the plate also has a central entrance with parlor at the right of the hall and living room at the left. Directly at the rear and adjoining the kitchen is the larder and the window which lights it looks out upon an enclosed yard. On the second floor are three sleeping rooms, with the bathroom directly in the front over the main entrance.

The series of cottages in question, which vary in size, but agree in style and character with the two examples as here reproduced from the London *Building News*, were designed by W. G. Newton, architect, of Gray's Inn, London, England.

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A Record Year in Timber Preservation

The most notable progress yet recorded in the chemical treatment of timber to prevent decay was made in 1913, says a report recently issued by the American Wood Preservers' Association in co-operation with the Forest Service of the Department of Agriculture. The report states that 93 wood-preserving plants in 1913 consumed over 108,000,000 gal. of creosote oil, 26,000,000 lb. of dry zinc chloride, and nearly 4,000,000 gal. of other liquid preservatives. With these the plants treated over 153,000,000 cu. ft. of timber or about 23 per cent. more than in 1912.

Real progress in the United States dates from 1832, when the Kyanizing process using bichlorides of mercury, was developed. In 1837 were introduced the Burnett process, usinz zinc chloride, and the Bethel process, using coal tar creosote. It is these processes which are largely in use to-day.

In 1885 there were only three pressure plants in the United States, and in 1895 only fifteen. Since then, however, the industry has grown rapidly and in 1913 there were 117 plants.

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New York's Most Southern Skyscraper

Arrangements are rapidly going forward looking to the erection of what will be New York City's most southern skyskraper. It will be a structure of considerable charm, and while not of the cloud-piercing variety, being only 12 stories in hight, it will stand on historic ground at the north corner of Whitehall and State streets overlooking Battery Park. The plans have been prepared by architects Starrett & Van Vleck, Everett Building, New York City, and while originally intended to be 22 stories the design was changed in deference to the rising sentiment against buildings which shut out the light and air of their neighbors and tend to cause congestion in the streets.

Part of the site of the new structure once held the home of Peter Stuyvesant, the land then being the southernmost point of New York, and before the old Governor's home stretched the upper Bay with a view clear down to the Narrows. The affairs of the Dutch colony were directed from this house until the English took over Manhattan, when Governor Dongan made the Stuyvesant place his residence. Robert Fulton was a later occupant of the dwelling which replaced the Stuyvesant house. Fulton's home was right on the corner of Whitehall and State Streets. Here he worked out the problems of steam navigation. John Ericsson, builder of the famous Monitor, was a later tenant of the house.

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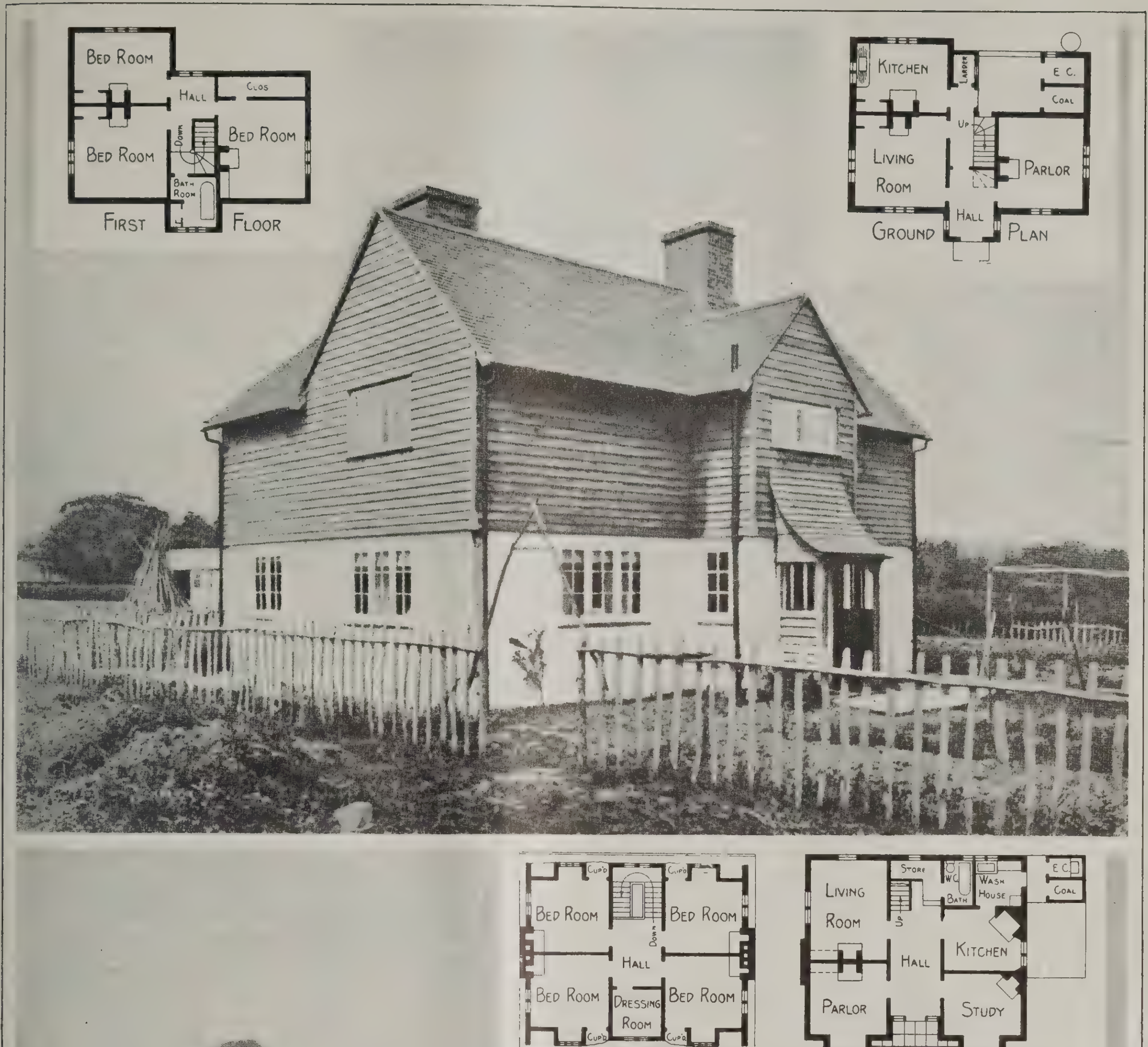
Right to Abandon Building Contract

The right of a building contractor to abandon a building contract on account of an unforeseen condition of the soil, necessitating more work than was contemplated when the contract was entered into, was recently considered by the Rhode Island Supreme Court in the case of Ford & Denning vs. Shepard Company, 90 Atlantic Reporter 815. From the facts of the case it appears that plaintiffs contracted to construct a building improvement for



Two Cottages of English Design, with Plans Showing the Arrangement of the Rooms defendant, and in excavating for the foundation came upon a bed of quicksand or other soft or loose material, which, as claimed by them, continued to rise through the opening made as fast as it was removed. After considerable negotiation, plaintiffs announced their refusal to proceed with the building, and brought suit to recover damages on the theory of a breach of the contract on the owner's part, and to recover the value of the work already done by them. Plaintiffs were awarded recovery in the trial court, but the Supreme Court reversed the verdict, holding that "it is well settled that the performance of a contract of this sort is not excused by the fact that there was a defect in the soil which rendered necessary a greater amount of work than was contemplated by the contractor at the time he executed his contract." But the court held that if defendant owner knew of the condition of the underlying soil and intentionally omitted from the plans and specifications matters which would be necessary to deal with the quicksand, for the purpose of deceiving plaintiffs, then they were entitled to abandon the contract. The court concludes, however: "We do not think that a knowledge of the quicksand on the part of the defendant, disconnected from any attempt or intention on its part to conceal it from the plaintiffs, or to prevent or deter them from an examination of the premises, would be sufficient justification for the breaking of the contract by the plaintiffs. If, however, as the plaintiffs now claim, and undertook to show at the trial, the character of the soil in that particular locality was a matter of common knowledge, the defendant might reasonably assume that the plaintiffs would be advised of it, or could easily acquire, and perhaps had acquired, a sufficient knowledge of it. Before entering into a contract for work of that character contractors usually subject the premises to examination, obtain borings, and otherwise satisfy themselves as to the underlying soil in which they are to operate."

Comparative Costs of Factory Construction

It is exceedingly difficult to lay down an absolutely definite rule as to the comparative economy of the methods of construction generally adopted for factory buildings. The accompanying figures relate to a case where competitive prices were obtained for a building of fair size and quite suitable to afford a basis for reliable comparison, says *Ferro-Concrete*. Alternative schemes were prepared and competitive prices obtained. Expressed in percentages, the results were as shown in the table.

1. Steel frame building with brick walls, corrugated iron roof, wood joists and boards on steel bearers to galleries, and patent roof glazing	100%
2. Reinforcing concrete building with roof at last	92%
3. Reinforced concrete building with concrete roof, part with lantern lights, and with brick panel walls	89%
4. Steel frame building, as No. 1, but with corrugated iron walls	89%
5. Reinforced concrete building (no other structural material used)	88%

It cannot be expected that the comparisons here given will apply to all factory buildings. The question of relative cost is affected a good deal by the number of stories and the size of the structure. In the case of small buildings, reinforced concrete may prove more costly than other materials, although far superior in strength, durability and freedom from maintenance charges.

Durability of New York's First Skyscraper

While the Tower Building—New York's first example of steel frame construction—was in process of demolition a short time ago, the Bureau of Buildings made an investigation with a view to determining the extent of deterioration of the metal during the 25 years since the building was erected in accordance with plans by the late Bradford L. Gilbert. The columns were of cast iron 20 in. square and 1½ in. thick in the basement and were fireproofed with an outer shell of cast iron ⅜ in. thick. The floor beams and girders were wrought iron I-beams with bolted field connections and although the outer walls of the lower five stories were supported on wall beams at each floor, the floor beams in the upper five stories were wall bearing, thus making the building conform only partly to the cage type of construction. The foundations were double rows of wooden piles driven to hard pan and having their upper ends encased in the concrete footings of the cast iron column bases.

The report stated that a careful examination made as the building was demolished showed "practically no case of very bad rusting; that is, of corrosion sufficient to impair the strength of the metal." One of the most noticeable cases of corrosion found was at the wind brace connection of a basement column where rust had formed around the bolt holes as well as over the entire contact surface of the connection angles. This, however, was not sufficient to reduce the strength to any material extent. The outer shell of a fourth-story exterior wall column was slightly covered with rust and rust spots were beginning to form on the interior columns, but a number of similar columns which were examined were found to be almost entirely free from rust. An entrance corridor floor beam exposed to moisture was almost wholly covered with rust except where mortar adhered to it. The investigation clearly demonstrated the excellent protection afforded by cement mortar in close contact with the metal.

Practical Application of the Quantity System

In view of the discussion which has been going on for some time past relative to the quantity system in estimating it is interesting to note that the authorities in charge of the construction of the new Municipal Building at Wilmington, Del., have awarded their contracts based upon the quantity system of estimating. The contract for the Newcastle County building has also been let upon the same system.

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We understand that Chicago has decided to create a zone on Michigan Avenue, between Randolph Street and Park Row, in which buildings may be erected up to a limit of 260 ft. in hight. This is 60 ft. higher than allowed by the present ordinance.

She Liked Her Yob

A SUBURBAN housewife relates overhearing this conversation between her new maid and the cook next door:

"How are you, Hilda?"

"I'm well," said Hilda. "I like my yob. We got cremated cellar, cemetery plumbing, elastic lights and a hoosit."

"What's a 'hoosit,' Hilda?" the puzzled cook exclaimed.

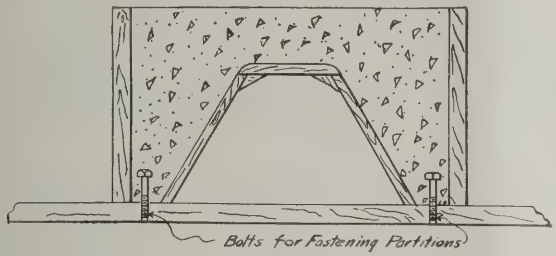
"Oh, a bell rings. You put a thing to your ear and says: 'Hello,' and someone says: 'Hello,' and you say: 'Hoosit?'—*Portland Spectator*.

Sanitary Feeding Troughs of Concrete

An Economical Method of Constructing Small Troughs for Use Upon the Farm—The "Forms" to Be Used

By Percy H. Wilson

ONE of the convenient uses to which concrete may be put in connection with the farm is in the construction of feeding troughs for hogs and poultry. This material gives a simple, sanitary and economical construction, and in the making of the "forms" old lumber free from splits and knot holes may readily be utilized. In order to procure an everlasting receptacle of the character indicated simply means the nailing together of two boards in the shape of an inverted V. These are placed on a board platform or other even surface and surrounded with a board frame or form, which is then filled with concrete. The concrete is struck off while fresh to insure an even bottom. No special finish is required and very rude work will answer the purpose.



Sanitary Feeding Troughs of Concrete—Fig. 1—Section Through the Trough Showing "Forms"

The dimensions of the trough will, of course, depend upon the length and size of the board forms. Small troughs for chickens or large troughs for hogs may be made with equal facility. Another simple method of making a small trough is to substitute for boards half of a drain tile or terra cotta pipe for the inside form. Where the boards are used it would be well to oil the surface coming in contact with the concrete. This makes the removal of the forms easy. A mixture of 1 part Portland cement, 2 parts sand and 4 parts crushed stone or gravel will make a good concrete for the purpose.

To prevent hogs from crowding or getting into the trough, cross pieces should be used as shown. To provide for bolting the cross pieces, holes should be bored in the platform at required intervals and the bolts set in with the thread end down. The bolts should go into the platform to a depth that will insure sufficient projection for the strap iron cross pieces and the nut. The concrete should be a "sloppy wet" mix and thoroughly puddled in the form. It should be kept in the form several days and protected from hot sun and wind. When sufficiently hard on the exposed surface to resist indentation with the thumb-nail, the forms may be removed. The concrete should then be sprinkled twice a day for the period of a week.

The strength of a trough of this character will increase with age. It may be easily cleaned and will resist the hardest usage. The longer it is exposed to the weather the more durable it will become.

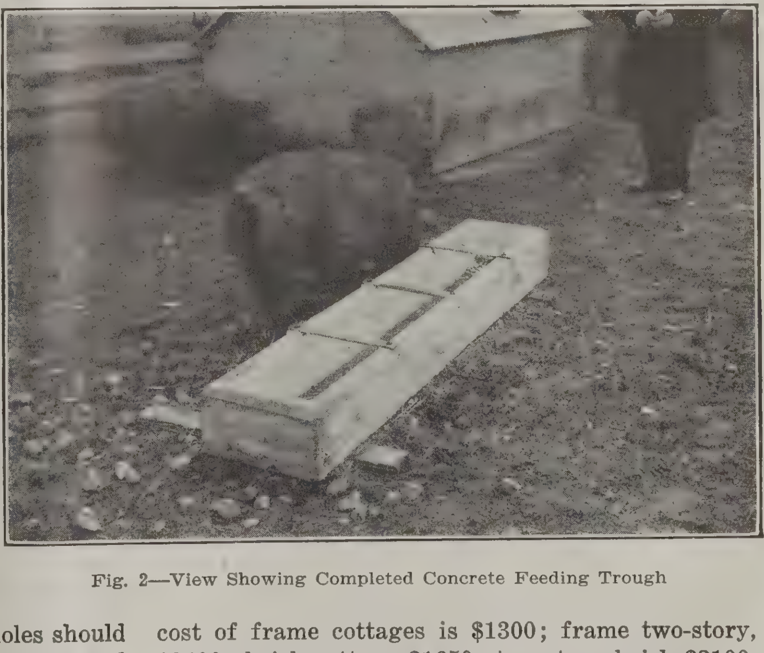


Fig. 2—View Showing Completed Concrete Feeding Trough

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The Cost and Maintenance of Brick and Frame Cottages

The Committee on Housing Conditions of the City Club of Chicago, Ill., has recently devoted considerable time in discovering the comparative cost of erecting and maintaining brick and frame cottages. The figures are based on the cost of cottages and two-story flat buildings, so common on 25 and 35 ft. lots on the outskirts of the city, the decorative features of which are confined mostly to the front. The sides and rear are as inexpensive as possible.

It has been estimated that a fair average on the cost of frame cottages is $1300; frame two-story, $2400; brick cottage $1650; two-story brick $3100. The average value of lots in the newer sections of the city has been estimated at $450.

These figures were used to determine to relative annual expense to the owners of brick and frame buildings, the annual expenditure including general tax, water tax, fire insurance, exterior painting and repairs, and renewal of roof extended over a period of sixteen years. On this basis the annual expense of frame cottages has been computed as $73.70 and brick at $57.60. Allowing 6 per cent. interest on the excess cost of the brick cottage the annual expense of this type over frame would be $4.90.

On the same basis the annual expense of a two-story frame flat building would be $100.16, and a two-story brick building $83, and allowing 6 per cent. interest on the excess cost of brick over frame construction, the annual expense of this type over frame would be $25. The general tax is figured at 1 per cent. on the full value, and water tax at $11; fire insurance for frame is figured at 50c. and brick at 20c., both on a three-year basis.

Painting costs have been calculated as averaging $65 for frame cottages, $85 for two-story frame, $30 for brick cottages, $50 for two-story brick cottages. For renewal of roof $8 per year is allowed, considering the average life of a roof at sixteen years at a cost of $120. No allowance is made for depreciation, but the following was allowed for exterior repairs: Frame cottage $10, two-story frame $15, brick cottage $5, two-story brick $7.

No figures were compiled on the prevailing type of better class suburban houses owing to the large variety of this kind. The committee has found, however, that the annual expense on brick or stucco houses for the suburbs would be considerably larger than the more ordinary houses, owing to the fact that all sides are in keeping with the front.

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Home Exposition for Chicago

Everything for the home will be shown in the Home Exposition to be conducted at the Chicago Coliseum from September 16-26. This educational campaign will be the most representative and comprehensive exhibition of its kind and will include everything that goes into the home as an aid to its comfort, convenience, economy, health and beauty.

Among the exhibitors to be represented are the following of interest to the readers of *The Building Age:* The Chamberlin Metal Weather Strip Co., The Judd Laundry Machine Co., The Morgan Sash & Door Co., and The National Kellastone Co. These companies are making preparations for representative booths for displaying their products in the most effective manner.

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Organization of Builders at Port Chester, N. Y.

For the purpose of settling amicably all differences which may at any time arise between employers and employees, the leading builders of Port Chester, N. Y., have just organized what is known as the Building Construction Employers' Association, with the following officers:

President.............J. Fred Dold.
Vice-Presidents....William Hamilton,
Harry S. Townsend,
Charles Marshall.
Secretary......Robert J. Armstrong.
Treasurer..............Neil Brown.

Contractors engaged in the building and construction business in Rye and in East Port Chester are included in the membership.

Completion of the Steel Frame Work of the New Equitable Building

The assemblage of the last tier of steel work on the mammoth Equitable Building in course of construction in lower Broadway, New York City, was completed at high noon on August 15th when an immense flag 20 by 30 feet in size was run up on the top of the structure to commemorate the event. This is the customary procedure in connection with the frame work of steel skeleton sky scrapers in New York City and when the American flag is seen floating from the top tier of the iron work of such a building in course of construction it is an announcement of the fact that the highest point of the steel work has been reached.

The contractors—the Thompson-Starrett Company—announced that at the time the flag was run up on the Equitable Building they were 14 days ahead of their schedule, an achievement which can be gauged by the fact that in less than five months they have reared and riveted in solid mass 32,000 tons of metal. In addition a large proportion of the masonry work has been finished.

An interesting feature in connection with this building is the smoke-stack which has been put in place as the work of construction progressed. This stack is 12 feet in diameter and 600 feet in height.

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Fire Prevention in New York's Hospitals

The Commissioner of Charities for New York City has given instructions to proceed with the work, which was interrupted several months ago, of developing a special system of fire prevention and life protection in the hospitals and other institutional buildings of his department. The work is in the hands of H. F. J. Porter and A. L. A. Himmelwright, consulting engineers of the city. Fire Commissioner Adamson, who had made a special examination of the fire hazard in the buildings of the Department of Charities, was impressed with its seriousness, and strongly endorsed the method of treatment of these buildings which the engineers in question advocated, and now that it has been authorized he has issued instructions to the representative heads of the fire prevention bureau, the fire-fighting force and the bureau of fire alarm and telegraphs to co-operate with these engineers in working out the details and in the installation of the improvements and equipment proposed by them. Owing to the importance of this work it is to be pushed as speedily as possible.

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Leading manufacturers of concrete blocks in the city of Detroit have recently organized as the Standard Concrete Block Manufacturers, the idea being to put forth concerted effort for the purpose of bringing more prominently to the attention of architects, and especially the public, the value as a building material of the product which they manufacture.

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The Board of Education of New York City is planning to erect thirteen new school buildings to provide trade education for 10,000 boys and girls who now leave school at an early age poorly equipped for such work.

Current News of Builders Exchanges

Annual "Outings" of Various Organizations—Elections of Officers—Formation of Albany Exchange

Annual "Outing" of Contractors and Dealers Exchange of New Orleans, La.

THE Seventh Annual Outing of the members of the Contractors and Dealers Exchange of New Orleans, La., given on Thursday, July 23, across Lake Pontchartrain and up the picturesque Tchefuncta river was probably the most successful excursion in the history of that organization. There were more than two hundred members and guests aboard the big barges of the Jahncke Navigation Company, which were towed across the lake by the company's tug, "Claribel." The outing had its beginning at 7.00 Thursday morning at West End and it was not until 8.00 o'clock Thursday night that the big tug pulled into the New Basin canal and the excursionists disembarked.

The day was one of genuine pleasure, and but for a light squall and shower at the mouth of the Tchefuncta river, there was nothing to interfere with the carrying out of the delightful program arranged by Walter F. Jahncke, president and chairman of the general arrangement committee, assisted by other well-known members of the Exchange. One feature not on the regular program, but which proved to be one of the very pleasing incidents of the outing, was the presentation of a handsome silver loving cup to President Jahncke in recognition of the service he has rendered the Contractors and Dealers Exchange.

President Jahncke of the New Orleans Exchange Being Presented with a Silver Loving Cup

This presentation took place on the dining barge before serving the afternoon meal. James H. Aitken, master of ceremonies, was presented with a diamond ring as a token from his friends for his tireless efforts in behalf of the Exchange.

The members and guests were amply provided with good things to eat and drink throughout the day, and while the affair was distinctly a "stag" event there were several red, pink and green wigs in the crowd to permit dancing and the carrying out of a number of vaudeville stunts.

Breakfast served as the party was leaving the canal at West End, at 8.00 o'clock, was a satisfying one, and the dinner, in the early afternoon, while the boats were in the beautiful Tchefuncta River, was a pretentious affair. There was real green turtle soup, red fish, court bouillon, rich in dressing and seasoning, with smoking hot boiled new potatoes with butter sauce, fried chicken that would make a vegetarian forget his habit even of a lifetime, served with green garden peas and corn on the cob, and numerous other dishes good to the palate—not overlooking that salad every hungry man likes—tomatoes, cucumbers, sweet peppers and sliced onions, with French dressing. And there was just as much as any one desired to eat, or could eat. Big dishes, piled high, were everywhere, and when they were exhausted, others, smoking hot, were quickly in their places.

Albany Builders Exchange

The Builders Exchange at Albany, N. Y., has just been organized by a number of the leading contractors of that city and the following officers have been elected:

President	William G. Sheehan
Vice-President	Edward A. Keeler
Treasurer	Thomas McKeon
Secretary	William Jay White

Picnic of Rochester Builders and Traders Exchange

The members of the Builders and Traders Exchange of Rochester, N. Y., held its tenth annual outing July 22 at Cobourg. The members and their guests left the Buffalo, Rochester and Pittsburgh station at 9 o'clock and connected with the boat at the Genesee docks. The program included a number of contests and the day was spent in a most enjoyable manner. Fred Zeitler, an honorary member, and his band were engaged for the occasion.

The committee in charge consisted of William M. Frederick, George L. Swan, Charles W. Luther, Charles S. Rauber and Secretary G. Henry Fish.

The Detroit Builders and Traders Exchange

The fourth annual outing of the Builders and Traders Exchange of Detroit, was held as per schedule on Tuesday, June 16, at Bois Blanc Island. There were 434 in the party and all enjoyed themselves to the utmost. There were guessing contests for men, women, boys and girls; there were foot races, baseball games, fine music by Stone's orchestra and souvenirs were given away, by which the occasion was still more impressively remembered.

The July number of the *Bi-Monthly Magazine* issued by the Builders and Traders Exchange is replete with interesting matter relating to the organization and those connected with it.

The Public Lighting Commission of the city at the instigation of the Detroit Electrical Contractors Association and the Builders and Traders Exchange are preparing a new ordinance to regulate electric wiring and the use of electricity in the city.

The convention of the National Electrical Contractors Association, at which over 600 were present, was held in the city July 16 to 18 inclusive with headquarters at the Cadillac Hotel.

Officers of Halifax Builders Exchange

At the first general meeting of the reorganized meeting of the Builders Exchange of Halifax, Nova Scotia, the following officers were elected for the ensuing year:

Honorary President	S. M. Brookfield
President	A. D. Falconer
Vice-President	James Farquhar

There were also ten directors elected, and a new constitution and by-laws were adopted.

Picnic of Toronto Builders Exchange

The members of the Builders Exchange of Toronto, Canada, held their annual picnic at Queenston Heights on July 16, and in advertising this affair the daily bulletin of the Exchange published the following rather unique announcement, the words in italics representing the names of different members of the Exchange:

"Summer is again with us, and our thoughts are running to the *Woods.* It is, therefore, decreed that on July 16th next we shall again lock that *Wickett* and take a *Cruise* to Queenston Heights for another grand *Picnic* under the same old *Skipper.* Last year we had a *Bulley* crowd, but this year we want it to be a *Champion* one. As *Cupid* seems to play a *Noble* part at these functions, we have arranged for lots of *Love* to be present. The same arrangements have been made as to tea, etc., so all can come prepared to *Peck-Over* everything, even to the *Berry,* and there need not be an *Aiken-Head.* As there were a few accidents to clothing during the ball game, we have arranged for a *Taylor* to accompany us, and for those who get spots knocked off a *Painter* will be in attendance. There will also be a *Gardiner* to prepare the race course, and therefore no spider's *Webb* will be seen. It may not be generally known, but there is a *Beaver* always on show at our picnics, and *Ganders* may be seen on the small lake in the grounds.

"We hope that all members will mark the *Page* in their diary that holds the date, as we are sure that they will return to town feeling much *Weller* than thel left it."

Chicago Association Elects Officers

Charles W. Gindele was re-elected president of the Chicago Building Construction Employers' Association at a meeting held at headquarters. The reports of the officers indicated the passing of a most successful year, and in the report of the president an appeal for greater co-operation and organization among members was advocated. The secretary's and treasurer's reports were also read, and the former revealed the addition of 112 members throughout the year, increasing the membership list to 591.

Secretary Edward M. Craig anticipates that 1914 will witness harmonious work in co-operating with the Building Trades Council in the settlement of labor disputes by arbitration. The officers elected were as follows:

President	Charles W. Gindele
Vice-Presidents	A. E. Coleman Charles G. Fanning George Mehring H. K. Townsend
Treasurer	E. F. Pierce
Secretary	Edward M. Craig

Outing of "Twin Cities" Exchanges

The members and friends to the number of 600 of the Builders' Exchanges of St. Paul and Minneapolis enjoyed the annual outing on June 20 at Wildwood, White Bear Lake. The weather during the forenoon was rather against a full enjoyment of the occasion, but the members were undaunted by old Borealis and went ahead with the program which had been prepared. There were running races for contractors, sub-contractors, fat men and bonding men, but the event of prime interest was the ball game between nines from the two Exchanges. The St. Paul team appeared for the first time in their new uniforms, but this seemed to have no deterring effect upon the snap and dash with which the team from the Minneapolis Exchange went at them with a final score of 13 to 4 in favor of Minneapolis. The feature of the contest was the battery work of Leighton and Brown of the winning nine. The pitching of Leighton was a most excellent exhibition and would have done credit to a professional.

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John R. Davidson for two years past secretary of the Builders Exchange at Prince Albert, Sask., has resigned to accept a position, it is understood, with the Dominion Government.

The Present Building Situation

Building operations during July were not appreciably affected by the general demoralization in many lines of commerce and industry growing out of the war in Europe. Despite the fact that building loans in the larger cities of the country were cut off at the end of the month by the outbreak of hostilities abroad, many of the leading operators and building contractors have been inclined to take an optimistic view of the situation which has been so suddenly thrust upon them. The fact that large loaning institutions have decided to withhold all new building loans does not necessarily mean that new construction work will altogether cease. Everything contracted for will be paid as agreed, but nothing new is being considered. Consequently for the next few months there is not likely to be that great diminution in building activity which some might anticipate, except as may be due to the growing feeling of conservatism which pervades all circles and which will doubtless continue until the financial situation assumes a more normal outlook.

Locally three of the five boroughs constituting Greater New York show an increase in the estimated cost of the building improvements for which permits were issued in July as compared with the corresponding month last year, although for the entire city there was a loss of 7 per cent. The striking feature is the Borough of Manhattan, where 481 permits were issued last month for new building, alterations and repairs involving an outlay of $5,325,084, whereas in July, 1913, there were 524 permits issued for building improvements estimated to cost $9,155,641.

In the Bronx last month 367 permits were issued calling for an outlay of $2,263,983, which figures compare with 364 permits in July last year for buildings costing $1,300,139. Brooklyn shows not only an appreciable gain in the permits taken out, but also in the total estimated cost, the figures being 1188 permits costing $3,679,946, and 868 permits costing $2,896,035 in the two periods respectively. In Queens, where a considerable amount of dwelling house construction has been in progress, there were 428 permits taken out last month for new work estimated to cost $2,339,292, while in July last year 297 permits were issued for improvements costing $1,311,488.

Reports from over 140 cities of the country for July indicate an estimated expenditure of $81,024,340, as compared with $76,186,850 in July a year ago. Taking the country over there seems to be a more equitable division of projected work as compared with a year ago than has been the case for some time past. In other words, there is not the sharp distinction of decreases in the larger cities as against increases in the smaller places.

For the first seven months the figures for the two years more nearly balance, 1914 being behind the first seven months of 1913 by only a trifle more than 5½ per cent. in a total of over $515,000,000.

◆

The members of the Builders Exchange of Edmonton, Alberta, Canada, held their annual picnic in July at Wabamum Lake. An extensive program of sports was carried out and numerous prizes awarded.

(Crown Cotton Mills, Dalton, Ga., uses twenty-three 30-inch glass top Burt Ventilators.)

Ventilation in a Cotton Mill

is a vital necessity and the ventilator installed must be capable of exhausting foul air all the time—especially in calm weather when the lack of a draught-creating breeze renders the ordinary ventilator useless.

Burt Ventilators

are at work all the time. "Dead" air has no effect upon their efficiency, which is a revelation to users of ordinary ventilators.

Burt ventilators are absolutely storm-proof. When the glass-top feature is desired they form a combination of ventilator and skylight. Because of the Sliding Sleeve Damper, the ventilator can be closed in severe weather, without retarding the passage of daylight. This damper can be adjusted in any position by means of a special attachment without tying chain to hook or post, as in the case of the common flat damper.

Send today for the 128-page Burt Ventilator Catalog, showing the use of the Burt under all conditions.

The Burt Manufacturing Co.

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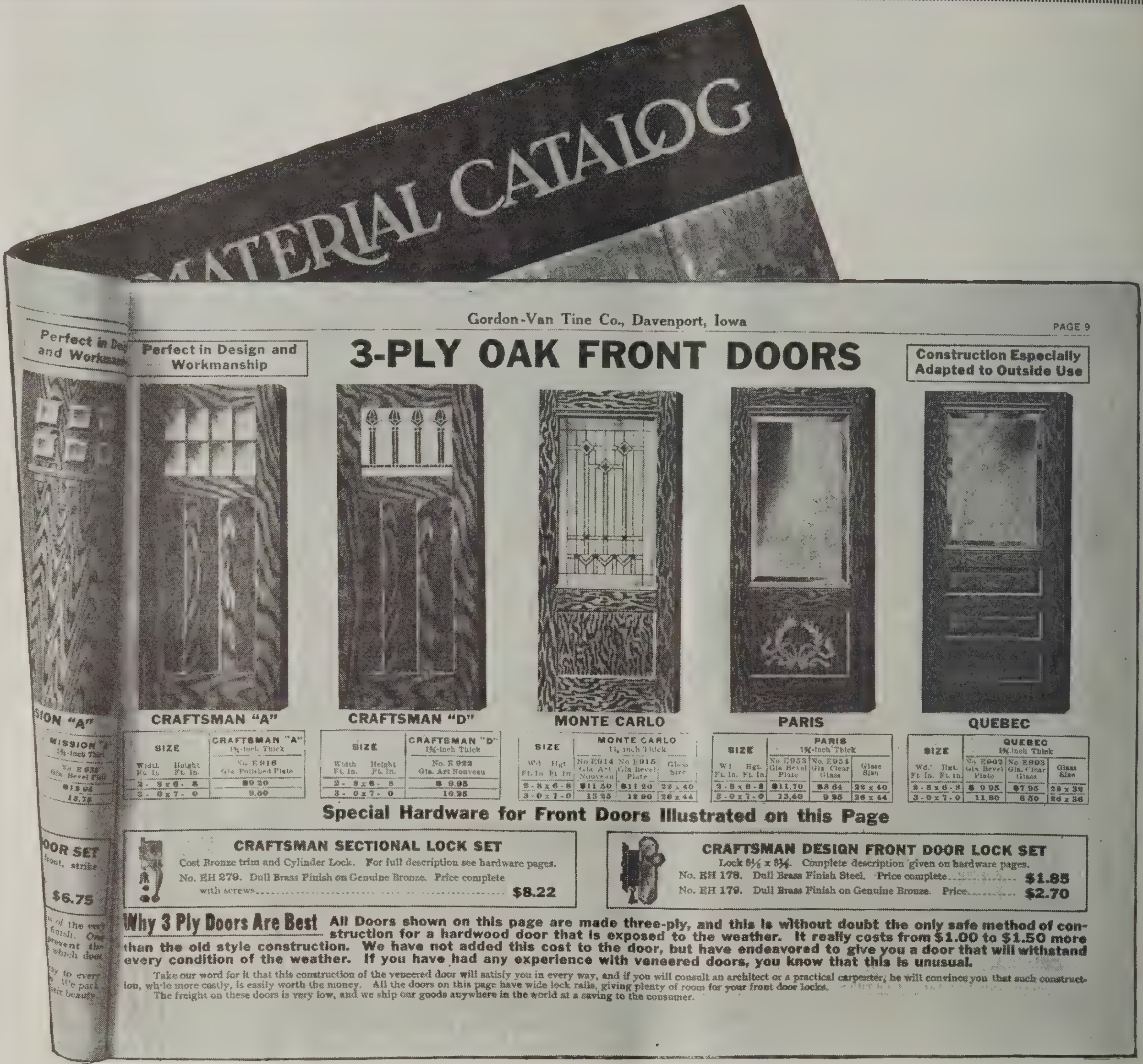


MATERIAL CATALOG

Gordon-Van Tine Co., Davenport, Iowa PAGE 9

Perfect in Design and Workmanship

3-PLY OAK FRONT DOORS

Construction Especially Adapted to Outside Use

CRAFTSMAN "A" CRAFTSMAN "D" MONTE CARLO PARIS QUEBEC

SIZE Width Ft. In. Height Ft. In.	CRAFTSMAN "A" 1¾-inch Thick No. E916 Gla. Polished Plate
2-8x6-8	$9.30
3-0x7-0	9.60

SIZE Width Ft. In. Height Ft. In.	CRAFTSMAN "D" 1¾-inch Thick No. E923 Gla. Art Nouveau
2-8x6-8	$9.95
3-0x7-0	10.95

SIZE Wd. Hgt. Ft. In. Ft. In.	MONTE CARLO 1¾-inch Thick No. E914 Gla. Art Nouveau	 No. E915 Gla. Bevel Plate	Glass Size
2-8x6-8	$11.50	$11.20	22 x 40
3-0x7-0	13.25	12.90	26 x 44

SIZE Wd. Hgt. Ft. In. Ft. In.	PARIS 1¾-inch Thick No. E953 Gla. Bevel Plate	 No. E954 Gla. Clear Glass	Glass Size
2-8x6-8	$11.70	$8.64	22 x 40
3-0x7-0	13.40	9.95	26 x 44

SIZE Wd. Hgt. Ft. In. Ft. In.	QUEBEC 1¾-inch Thick No. E902 Gla. Bevel Plate	 No. E903 Gla. Clear Glass	Glass Size
2-8x6-8	$9.95	$7.95	22 x 38
3-0x7-0	11.80	8.50	26 x 36

Special Hardware for Front Doors Illustrated on this Page

CRAFTSMAN SECTIONAL LOCK SET
Cost Bronze trim and Cylinder Lock. For full description see hardware pages.
No. EH 279. Dull Brass Finish on Genuine Bronze. Price complete with screws.......... $8.22

CRAFTSMAN DESIGN FRONT DOOR LOCK SET
Lock 5⅛ x 8¼. Complete description given on hardware pages.
No. EH 178. Dull Brass Finish Steel. Price complete.......... $1.85
No. EH 179. Dull Brass Finish on Genuine Bronze. Price.......... $2.70

Why 3 Ply Doors Are Best All Doors shown on this page are made three-ply, and this is without doubt the only safe method of construction for a hardwood door that is exposed to the weather. It really costs from $1.00 to $1.50 more than the old style construction. We have not added this cost to the door, but have endeavored to give you a door that will withstand every condition of the weather. If you have had any experience with veneered doors, you know that this is unusual.

Take our word for it that this construction of the veneered door will satisfy you in every way, and if you will consult an architect or a practical carpenter, he will convince you that such construction, while more costly, is easily worth the money. All the doors on this page have wide lock rails, giving plenty of room for your front door locks.

The freight on these doors is very low, and we ship our goods anywhere in the world at a saving to the consumer.

Every Carpenter is Asked to Write Us

We want to place our famous catalog of 5000 bargains in the hands of every carpenter and contractor ! !

SEND us your name by post card or letter today ! ! We want to send you our latest catalog of our newest best bargains in *guaranteed quality* building material.

We want you on our mailing list so we can send you bargain price *bulletins* from time to time.

Thousands of the most successful contractors and carpenters keep our great catalog and valuable books on hand to guide them in *buying* and *estimating.*

Ten thousand contractors and carpenters buy practically *all* their building materials, lumber, hardware, paints and the like of us.

Because they can figure *lower.* They can give better *quality.* The qualities are *always the same* guaranteed standard. Our *shipping service* is ideal. The freight costs are a *trifle.*

Our stocks are so complete, *always,* that no building job is ever held up because of delay on a few items.

We carry in stock hundreds and hundreds of bargains that can be bought elsewhere only on *special order* at high prices.

The facts are that the Gordon-Van Tine Co., offers contractors and carpenters the *biggest, broadest, finest stock* of quality building material *on earth.*

Quality for quality our *prices* are the *lowest.*
Our *service* is the *quickest.*
Our stocks give the *greatest selection.*
Our *guarantee* covers everything.

Write ! ! **THE GORDON-VAN TINE CO., 722 Federal St., Davenport, Ia.**

Xtra!! Special Timely Bargains in Storm Sash! Write

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Development of the Hardwood Door

ONE of the important features of the interior finish of the modern home is the style and character of the doors which are used not only for the principal rooms, but throughout the entire building. A well finished door carefully hung and operating easily and without noise is a delight to the occupants of the house and stamps the owner as a man who believes in being thoroughly up to date. In recent years hardwood doors have grown immensely in popularity both by reason of the beautiful results accomplished in their finish and in their ultimate economy. When the demand first arose for hardwood doors the manufacturer was confronted with a rather serious problem. He fully appreciated the fact that a door made from solid pieces of hardwood is heavy and unwieldy while at the same time it is likely to warp, twist, open at the joints and cause any amount of trouble. One of the first concerns to solve the problem and commence the construction of hardwood veneer doors which would be light, strong, durable and weatherproof and at the same time retain all the exquisite beauties of the hardwood grain was the Morgan Sash and Door Company, Chicago, Ill., whose beautiful catalogue we mentioned in our last issue and a photo-reproduction of two pages of which we present in the accompanying picture, Fig. 1 of the illustrations.

Exterior Door. Design Craftsman A — Brown Ash

Built in different woods

Page twenty-four

Exterior Door and Sidelights. Design Craftsman B — Plain Red Oak

Built in different woods

Page twenty-five

Development of the Hardwood Door—Fig. 1—Reduced Fac-simile of Two Pages in the Handsome *Brochure* Issued by the Morgan Sash & Door Co., of Chicago, Ill.

One of the secrets of the excellence of Morgan doors is, that every piece of wood going into the door is made absolutely dry. After having once been dried, this wood is kept in rooms heated to a high degree of temperature so that no moisture can re-enter the doors. After a thorough preparation in this manner, the cores or foundations are built up of narrow strips of pine with edges of hardwood glued together with the very best of veneer glue, brought together by powerful hydraulic pressure and kept in pressure retainers for many hours, which makes a perfect and durable joint. After this operation the cores are planed to an even thickness, then the face or surface veneers are applied, and again subjected to tremendous hydraulic pressure for many hours. The grain of the core or center piece is always placed at right angles to the grain of the veneer. This increases the strength and makes swelling, shrinking or checking impossible.

For flush or sanitary doors, this company has a special dowel construction. The core is built of pine with 6-inch stiles and 12-inch cross rails. Not only the stiles are doweled but the cross rails as well. After the core or frame of this door has been put together and re-dried, it is then planed and sanded to an even thickness. After this operation cross banding of 1-16 inch is put on after which the face veneer of ⅛-inch is applied, and then hydraulic pressure of 300 tons is used which gives a uniform pressure on the entire surface, irrespective of size. Such a construction permits the company to build flush or sanitary doors which can be guaranteed as perfect. The company is most particular in the selection of the veneers for its doors and only the best grained and the best quality of veneers are used. The different designs of Plain Oak, Brown Ash and Birch doors pictured in their new catalog show the beautiful figure of each wood. The Mahoganies and Quarter Oaks are always selected for color and figure. In the picture which we give on the previous page the doors shown are brown ash and plain red oak.

Morgan doors are designed and built along original ideas. The company has a history of forty years of door making and in its factory the latest and most approved models of door making machinery are installed, and much of the process is absolutely original with the Morgan Co. Each door coming from the factory and bearing the Morgan name stamped on the top rail, is guaranteed to be absolutely perfect in every respect, and this guarantee means that, should any defect be found, a Morgan door will be immediately replaced by a new one, free of charge.

A Galvanized Iron Window Awning

An awning for windows and doors made of galvanized sheet iron and so constructed that it can be shipped "knocked down" has just been placed upon the market by George Koch Sons, Inc., 1014 West Pennsylvania Street, Evansville, Ind. The edges of the sheets are so turned that it is a comparatively easy matter to insert the different edges in the places intended to receive them to make a complete and compact covering for a door or window ranging from 2 ft. 4 in. to 3 ft. in width and projecting from the building 32 in. The standard size is 42 in. in length, thus giving a slight extension beyond the width of a 3 ft. door. Different sizes, however, can be furnished according to needs.

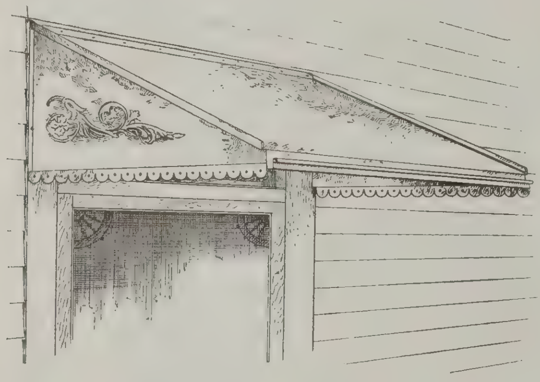


Fig. 2—A New Galvanized Iron Window Awning

It is pointed out that this awning being of metal reduces the fire-risk of the building and does not rot out and cause the annoyance of hoods or awnings constructed of wood. As may be seen from an inspection of Fig. 2 there is a small gutter designed to catch the drip and carry it off at either end in accordance with the pitch given to the gutter when the awning is erected. When the awning is used in connection with a window it is possible to leave the latter open during a storm and enjoy ventilation that would not be available if the window had to be closed to keep out the rain.

White's Improved Builder's Transit

A new and improved transit designed especially for builders and which is illustrated in general view in Fig. 3 has just been placed upon the market by David White Company, 419 East Water Street, Milwaukee, Wis. This instrument is recommended by the makers for leveling foundations, taking angles, giving lines and levels for buildings, lining up girders and walls as well as all work of a similar nature which enters into the operations of the building contractor. The Reconnoissance Transit, as it is called, is referred to as being light, compact, accurate and durable—four prime requisites which generally characterize a transit that tend to please the practical, up-to-the-minute builder of the present day. It might appear to the uninitiated that to operate a transit of this kind required a thorough knowledge of engineering and higher mathematics, but such is not the case owing to the simplicity of the instrument and the fact that it can be successfully used without any special training. In the third edition of an attractive catalogue on surveyors' instruments just issued by the David White Company, this transit is illustrated and described, as are also the leading lines of other instruments made by this well-known concern. The list includes many which are intended especially for the use of the architect, the contractor and the builder and any reader interested in instruments of this character can obtain a copy of the catalogue free of charge by simply sending to the address above given.

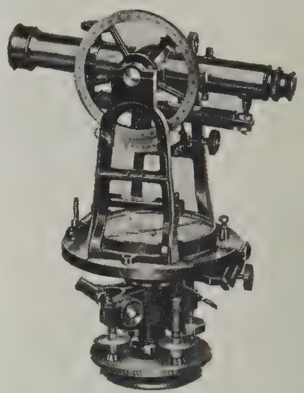


Fig. 3—White's Improved Builder's Transit

Improvement in the "Little Devil" Concrete Mixer

A short time ago we presented in these columns an illustrated description of the "Little Devil" concrete mixer made by the Chicago Builders' Specialties Company, Old Colony Building, Chicago, Ill. Since then the company has incorporated an improvement in the way of a hoisting device which especially adapts the mixer for use in connection with silo construction. The hoisting drum is located on the main driving shaft and is controlled by a powerful friction clutch. The hoist can be operated while the drum is empty or the two can be operated at the same time as circumstances may require. It has a capacity for 150 ft. of cable and can easily lift one ton. It is figured to handle a batch of mixed concrete at a time and will be found a great convenience and labor saver when filling the "forms" as in silo work. In Fig. 4 of the engravings we present a general view of the improved "Little Devil" construction, clearly showing the hoisting mechanism.

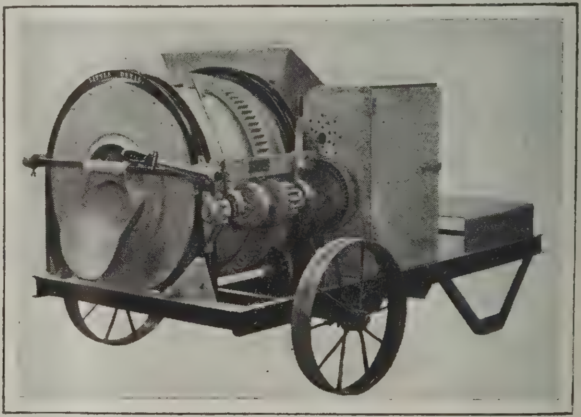


Fig. 4—Improvement in the "Little Devil" Concrete Mixer

(*Continued on page* 72)

If You Were Building for Yourself

AN OKLAHOMA contractor who is planning to build a home of his own wants ***Arkansas Soft Pine*** for framing. He has used it, knows what it is and what he can do with it. For that reason he ***wants it in his own home.***

If you were building for yourself wouldn t you want the best within reach of your pocketbook?

Wouldn't your first care be the selection of materials based on your knowledge of them?

The contractor's home should be a living advertisement of his knowledge of building material values and his skill and ability in assembling them.

Contractors familiar with the merits, beauties and economies of ***Arkansas Soft Pine*** use it when they build for themselves.

Discuss the question of supply with your local dealer. He can furnish you ***Arkansas Soft Pine*** for framing, for outside trim, for siding, ceiling, flooring, and you can secure from the dealer or the local planing mill your interior trim and woodwork.

Now on the Press; ready for distribution in a few days: "Uses of Arkansas Soft Pine for Building." Write TO-DAY for your copy.

Arkansas Soft Pine Bureau

1738 Transportation Building **Chicago, Ill.**

Stanley's
Metal
Door
Butts
S.W.

Holes accurately drilled to Template to insure perfect fit.

Made with Non-Rising Pins and equipped with Ball Bearings.

Write for full information regarding styles, sizes, finishes, etc.

"DEPARTMENT E"

THE STANLEY WORKS, New Britain, Conn.

Black Diamond
File Works

ESTABLISHED 1863 INCORPORATED 1895

TRADE MARK

TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

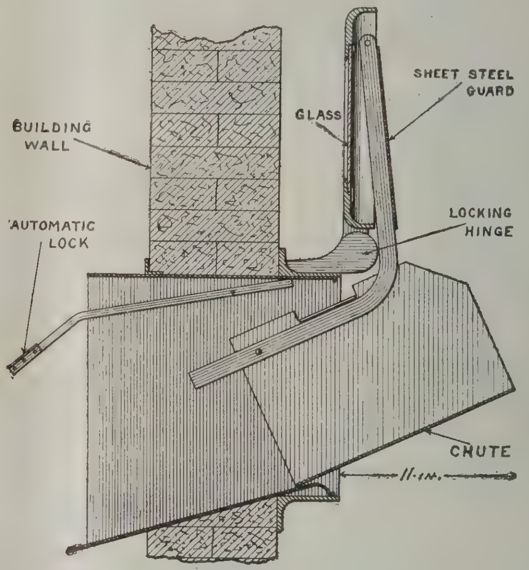
G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

A Quantity Survey Company

In view of the present agitation of the subject of the quantity system in estimating the cost of buildings, our readers are likely to be interested in learning of the formation of what is known as the Quantity Survey Company, Inc., with offices at 30 East 42nd Street, New York City, for the purpose of carrying on work of quantity surveying. We understand that this concern is prepared to make lists of quantities which it guarantees to be correct within a small percentage, backing up the guarantee with an acceptable surety bond.

The "Ottomatic" Coal Chute

A reliable automatic coal chute that with one operation opens the window, places a guard over the glass and pulls the chute out more than a foot is known as the "Ottomatic," sold by the Maximilian Co., 845 Monadnock Block, Chicago, Ill. Figs. 5 and 6 show that when the chute is closed an abundance of light comes through the glass face, and when open the chute extends out far enough to prevent the building being marred and to save coal from dropping to the ground. The chute is substantially constructed of cast iron and steel. The chute is placed in the foundation walls of the building and may be placed there either before or after completion of the building. Some of the distinct advantages claimed of the "Ottomatic" are that it is efficient in operation, fireproof, burglar-proof and fool-proof. The glazed-hinged window is provided with simple and strong-locking hinges to lock the window in an open position. The parts are all automatically moved from one position to the other by simply swinging the hinged window. On the inside the window remains fastened automatically by a gravity lock entirely within the building and easily accessible from the



The "Ottomatic" Coal Chute—Fig. 5—Sectional View Showing the Chute Open

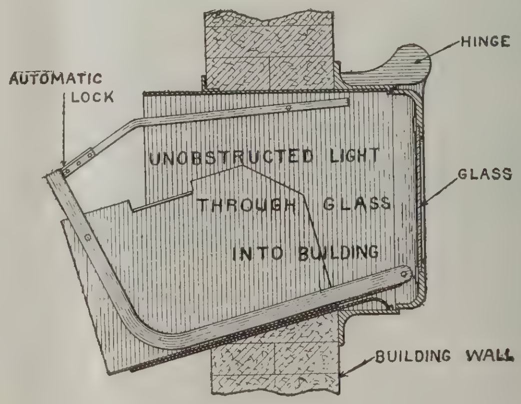
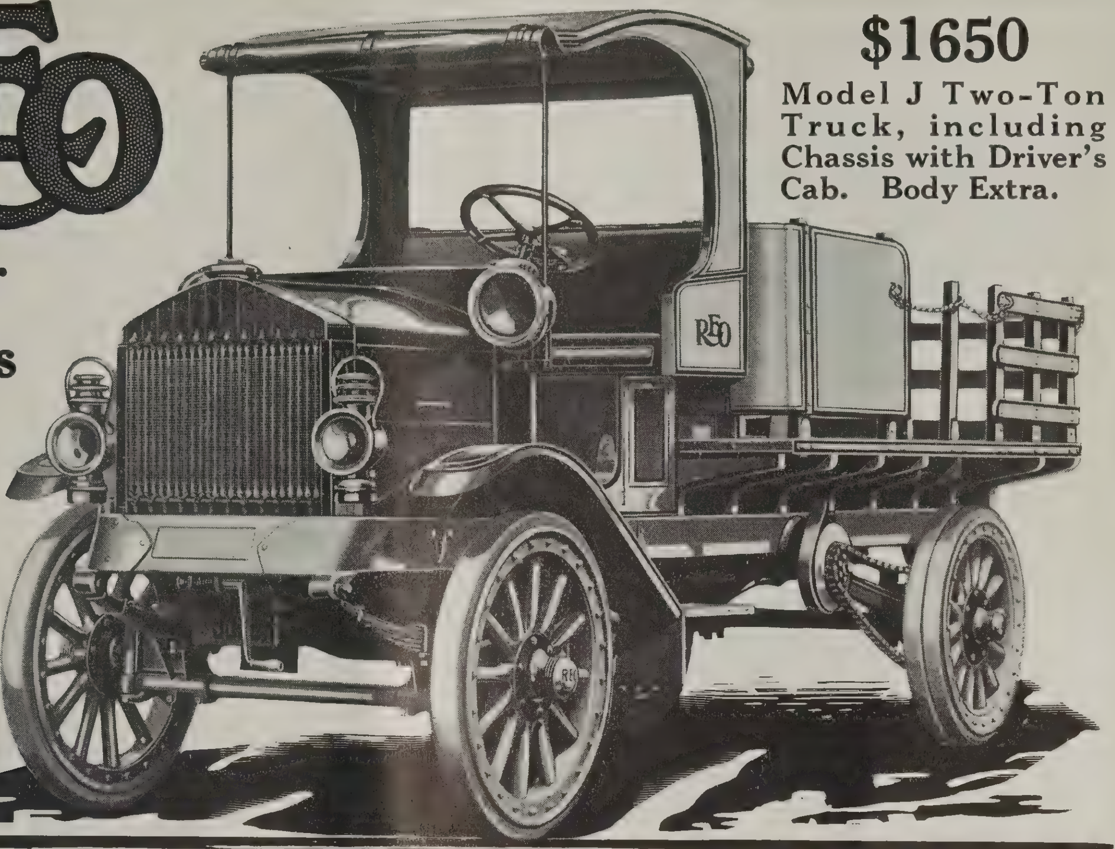


Fig. 6—View Showing the Chute Closed

(Continued on page 74)

REO

Motor Trucks



$1650

Model J Two-Ton Truck, including Chassis with Driver's Cab. Body Extra.

149 Different Lines of Business Find This the Ideal Motor Truck

Contractors and builders cut down their hauling expense with this truck and speed up their building operations. No more idle workmen waiting for delayed materials

Do you know how much your present wasteful method of hauling is costing you? Probably not, or you would have brought the Reo Motor Truck to your business long ago. Let us figure it out together:

The first cost is your first saving, for the Reo Model J Two-Ton Truck, selling for $1650, is less than the cost of two good teams and wagons—yet it does the work of three or more teams.

Only one driver's salary to pay instead of three or more for horse equipment.

You save in cost of operation. The Reo Motor Truck "eats" only when it labors and finishes the day as fresh and strong as it started out in the morning.

But the saving in time is the big item. Reo Motor Trucks will speed up every department of your business. As you deliver faster, you can build, sell, ship, assemble faster. Your whole business feels the spurt of this new form of energy.

Features that Mean Unbroken Service

The Reo Motor truck is carefully designed to keep going day after day for years. It has exclusive features, found in no other motor trucks, that make this constant service possible.

A radiator built of 24 independent, interchangeable units. One or several units could be injured, instantly repaired or replaced, and the run continued.

Much more power than you will ever need is supplied by the Reo unit power plant, cushioned on a sub-frame away from road shocks or vibration.

Reo hydraulic governor keeps the truck to a safe speed. An irresponsible driver cannot "race" the motor.

Reo right hand center control and left side drive give the driver quick and easy access to and from the seat. No expert driver needed.

Reo impregnable armored frame, built to withstand hard service—even collisions.

Your choice of two lengths of wheel base, 130 or 146 inches.

Set Your Truck to Work

If you are paying for a Reo Truck now, in wasted time and money, you should set it to work at once.

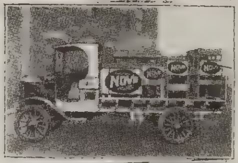
Look the facts in the face. Figure your present hauling costs, and write us about them. We will reduce our case to cold figures. Then we will ask you to decide on no other basis than your own profit.

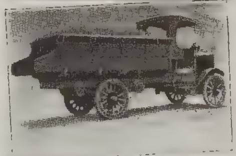
1155 Reo dealers, scattered from coast to coast, are ready to tell you about Reo Motor Trucks and Reo service.

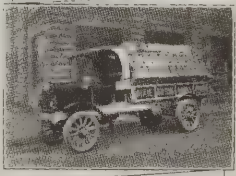
A Reo Motor Truck catalog sent on request.

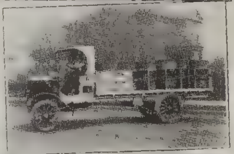
YOU CAN DO IT WITH A REO

Reo Motor Truck Co.
Lansing
Michigan



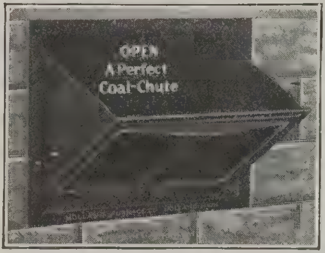






The WINDOW CHUTE

For Your Coal Bin



Ready for the Coal Man.

The Window Chute is a selling feature for any Residence or Building.

Thousands in Use—
The Very Best

If You Build
Buy
Own

Be up to date and have the world's best.

Write for Booklet C

A Light Basement.

HOLLAND FURNACE CO.
Holland, Mich.
World's Largest Direct Installers of Furnaces

MAJESTIC COAL-CHUTES

Protect the Building

Acts as a window when not in use.

Made in two styles and two sizes.

Send for complete catalogue showing our Burglar Proof all metal Cellar Window.

THE MAJESTIC GARBAGE RECEIVER

Buries under the ground keeping the contents cool in summer and from freezing in winter.
Also contains a device for burning waste paper and refuse.
Write for full description.

THE MAJESTIC CO., 422 Erie St., Huntington, Ind.
Branch Office and Warehouse:
311 Reliance Bldg., Kansas City, Mo.

basement floor. The chutes are made in two sizes, the measurements of the outside frame being, for the No. 1, 17 x 24 in., and for the No. 2, 22 x 33 in. On the literature issued for distribution throughout the trade the company calls attention to the fact that it pays the freight.

"Sterling" Convertible Builders' Level

Builders, contractors and architects are manifesting much interest in a new convertible level recently brought out by a Philadelphia concern and a picture of which is given in Fig. 7. The new instrument is called the "Sterling" Convertible Builders' Level and its construction is such as to show that the makers have devoted considerable time studying the needs of the various lines of work for which it is intended. While it offers every facility for quick, accurate work of leveling, measuring horizontal angles, sighting points above or below the instrument, and locating and running lines of stakes, its simplicity of construction and the ease with which it can be operated makes technical knowledge or engineering skill unnecessary. These are only a few of the many uses to which such an instrument can be put, and the price places it within the reach of every contractor, architect, landscape gardener, highway engineer, and a host of others requiring a general purpose level of accuracy and reliability, while the high standards now required in practically every class of building work make an instrument of this kind a necessity. The makers publish an interesting booklet entitled "The Sterling Way" containing suggestions as to how a level may be applied practically and giving simple instructions for its use. A copy of this pamphlet will be sent free to any of our readers upon application to the makers of the instrument—the Warren-Knight Company, Philadelphia, Pa.

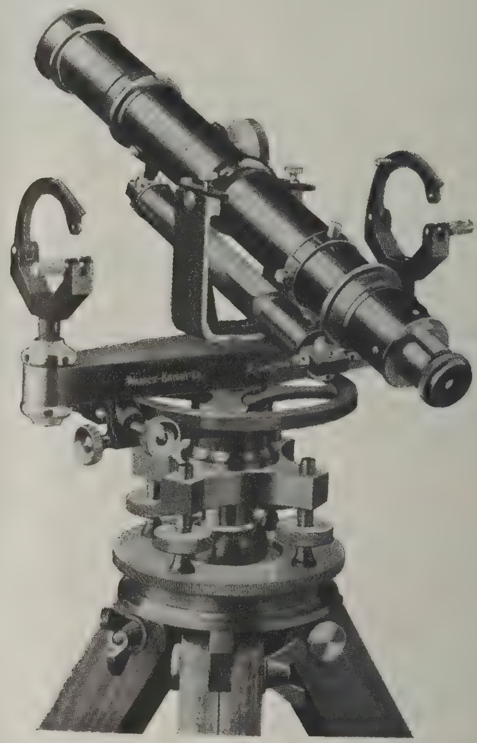


Fig. 7—General View of the "Sterling" Convertible Builders' Level

Sanitary Automatic Dumb-Waiter

Under the above title the York Automatic Dumb-Waiter Works, 641 West Market Street, York, Pa., has issued from the press an attractive catalogue setting forth the merits of the sanitary automatic dumb-waiters which it manufacturers in various sizes to meet many requirements. The refrigerator waiter to which the company calls special attention is built by converting the upper compartment into a chamber of modern construction having an ice chest and two

(*Continued on page* 76)

IMPOSSIBLE for us to name in a few lines all of the good things we have in the way of the newest and best tools but you should know about

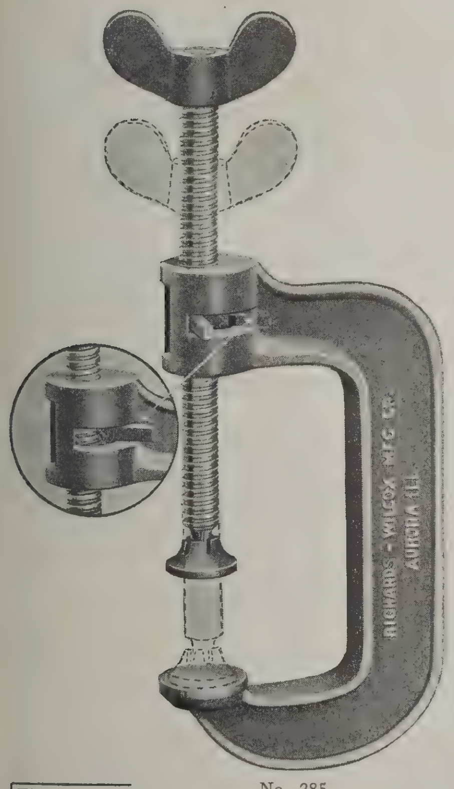
The celebrated Buck Brothers' Chisels and Gouges—ask for catalog No. 3199. The indispensable Jorgensen Adjustable Hand Screws—ask for circular No. 3200. The old reliable Colts Quick Acting Clamps—ask for catalog No. 3201. The genuine S. J. Addis London Carving Tools—ask for catalog No. 3202. Work Benches—ask for catalog No. 3203. Mitre Boxes—ask for catalog No. 3204.

We also carry regularly all the Yankee Tools, Stanley Rule and Level Co.'s and Miller Falls Lines, Hammond's Hammers and Hatchets, Russell Jennings' Bits, etc. You can purchase from us in one order all the best tools that the market offers. Correspondence invited.

HAMMACHER, SCHLEMMER & COMPANY

HARDWARE, TOOLS AND SUPPLIES

Fourth Avenue and 13th Street New York, Since 1848


RICHARDS-WILCOX MFG. CO.
AURORA ILL.

No. 285
R-W Save-Time Screw Clamp.

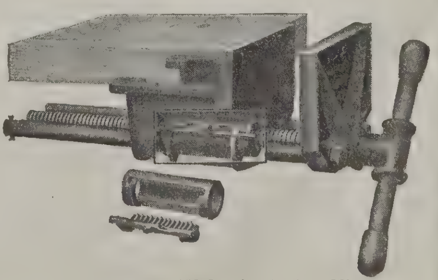
For Your Workshop

The penalties of getting along with cheap tools are loss of time, loss of results, frequent need of mending or replacing—all mean a loss of profit to you.

R-W Vises and Clamps

R-W vises have instantaneous adjustment, are continuous in action. No pawls, racks or triggers to break or wear.

R-W Save-Time Clamp is strong and well made with malleable iron frame, steel screw, bronze nut, quick adjusting. You need these tools—your dealer has them.



No. 430 R-W Rapid Acting Vise.

Richards-Wilcox

MANUFACTURING CO.
AURORA, ILL. U.S.A.

A hanger for any door that slides.

You protect your reputation

when you protect concrete with our special coating

When you put your best efforts into erecting a building of concrete, you should urge strongly the use of a reliable finish.

Leave a job to the mercy of the weather and there will likely be trouble—the surface will crack, bits of concrete will scale and check off and the rain will stain it. If such a job were pointed out as a sample of your work, you would not be proud of it. You take effectual steps to protect your reputation as well as the cement work of your customers when you finish it with

Lowe Brothers HI-SH CONCRETE and CEMENT COATING

CONCRETE AND CEMENT COATING

Free: Get this folder—Concrete and Cement Coating—and color card showing just how this finish looks on cement surfaces. With it we will also send color cards of *Lowe Brothers Elastic Cement Floor Finish,* which adds greatly to the appearance of cement floors, makes them easy to clean and does away with dust. Dust is a sign of wear. Write for the cards and folders today.

The Lowe Brothers Company
518 E. Third Street, Dayton, Ohio
Boston Jersey City Chicago Kansas City Minneapolis
LOWE BROTHERS, Limited, Toronto, Canada

See Sweet's Catalog, 1914 edition, pages 1916-1917

Straight Talks on Durametal Weatherstrips

¶ You contractors—carpenters and building owners—why not buy weatherstrips direct from the manufacturer and do your own installing?

¶ By our unique plan, we have cut out the usual big selling expenses, which enables you to buy direct from us, make a profit on the strip and good money on the installation besides.

¶ Durametal Weatherstrips have been successfully sold for over 10 years, and have stood every possible test. Their durability and simplicity make them superior to all others.

¶ Made of best heavy zinc, and fully guaranteed. Write for samples and prices now before you turn another page. There's money in this for YOU.

A few agencies open to responsible, live, local contractors and carpenters.

Durametal Weatherstrip Co.
12 East Austin Ave., CHICAGO, ILL.

shelves. The construction is packed with wool paper, sheet cork, mineral wool and asbestos sheathing for lining, thus producing an excellent cold retainer. The refrigerator cock which is used in draining the ice chest is made of brass and nickel plated to avoid tarnishing. The capacity of the ice chest is 50 lb., the ice being put into the chest through a specially constructed opening in the top surface of the waiter.

New Wire Stripping Plier

The latest addition to the extensive "Red Devil" family is the new wire stripping plier for electricians which has just been placed on the market by the Smith & Hemenway Company, 158 Chambers Street, New York City, and a general view of which is presented in Fig. 8. This particular plier is intended for use on cloth or silk covered wires of fine gauge such as No. 18, No. 20 and No. 22. As may be seen from the illustration the new plier is modeled along the lines of the popular electrician's diagonal plier and the stripping feature has been placed in the cutting edge in such a position as not to interfere with wire cutting. The new tool has hand honed cutting and stripping edges and is packed with the regular two years' insurance bond that accompanies all "Red Devil" bonded tools. The new tool is known as No. 1724 and will undoubtedly prove a convenient adjunct to the "kit" of the up-to-date electrician.

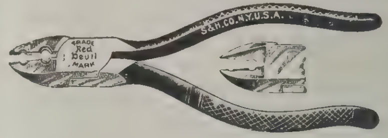


Fig. 8—New Wire Stripping Plier

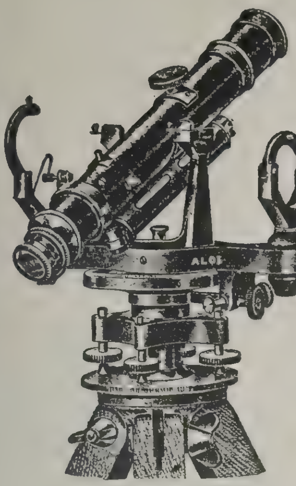
Outing of Employees of the Richards-Wilcox Manufacturing Company

The employees of the Richards-Wilcox Mfg. Company, Aurora, Ill., enjoyed a red letter day on August 1, at which time occurred their third annual picnic given by the company at Fox River Park, just south of the city. A most interesting program of games and contests had been provided and suitable prizes were offered in each case. One of the features was the "store" operated by the company. Tickets were given to all present, entitling them to soda water, cracker-jack, ice cream, cigars, free rides and lemonade. The opening event on the program was a ball game between teams selected from the office and factory forces, the latter winning by a score of 12 to 6. Four teams designated as the "All Steels," "Assemblers," "Wood Packers" and "Pen Pushers," were entered in the tug-of-war contest, the prize of $10 going to the "All Steels." Following the tug-of-war the dinner baskets were opened and their contents enjoyed in the shade of the great trees which make Fox River Park an ideal picnic ground. The afternoon was devoted to speed contests varying from a 50-yard contest for girls 5 to 7 years, to a race for married women 30 to 55, there being altogether a total of 26 events. After the races the contestants and spectators adjourned to the dancing pavilion for the prize waltz. This was followed by the grand prize drawing which closed the program of events.

The Neponset Doll House

A short time ago we called attention in these columns to the "Neponset" doll or playhouse which formed the basis of a page advertisement in the Saturday Evening Post of June 20 and a reduced fac-simile of which we reproduced in *The Building Age*. It may not be without interest to refer somewhat more in detail to the construction of this little house. Coming from New England and the very heart of New England at that, one could hardly expect its architecture to be anything but Colonial in style. It is substantially well built with solid wood frame and the windows are translucent fabric. The house is open at the back so as to permit

(*Continued on page 78*)



Rent this Level 10 Months Then It's Yours

Builders — Contractors — Architects

This is not the old style Architect's Level. It is the newest model *convertible* level. There is not a single Builder, Contractor or Architect who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder, contractor or architect can use the Convertible Level, sent free on request.

WARNING

The Level we offer is the new Aloe Convertible Level. Don't confuse the Convertible Level with the ordinary style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified transit and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

A. S. Aloe Co., 625 Olive St., St. Louis, Mo.

COUPON

A. S. Aloe Co.,
625 Olive St., St. Louis, Mo.

Please send free instruction book on the use of the Convertible Level and complete details of your rental plan. This request in no way obligates me.

Name ....

Occupation ....

Street ....

City.................... State............

B. A., Sept., '14.

SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.

No. 53.

A light floor or veneer Scraper with wood face to lessen friction.

A useful and convenient tool, low in price.

For full description of this and other

SARGENT WARRANTED PLANES

SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY

Makers of Squares, Planes and Mechanics' Tools

1153 Leonard St. New York

"YANKEE" TOOLS
Make Better Mechanics
Philadelphia Made Hardware
Ratchet and Spiral Screw Drivers
Push, Breast and Hand Drills

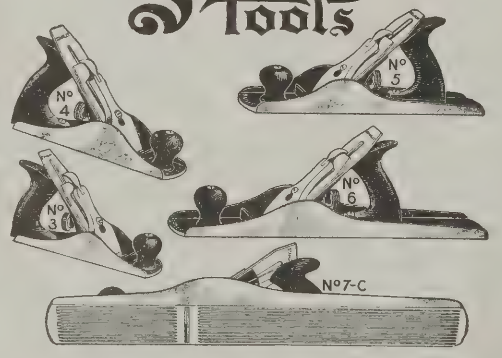
WHETHER a professional or an amateur, whether you hang a front door or build a chicken coop, there is a "Yankee" Tool to do the job easier and quicker.

There are now over one hundred different styles and sizes. Your dealer can supply you.

☞ Let us send you the "Yankee" Tool Book. A postal brings it.

North Bros. Mfg. Co.
Lehigh Avenue Philadelphia, Pa.

Stanley Tools



THE "BAILEY" IRON PLANE has been the STANDARD for over FORTY YEARS and has always maintained the leading position.

From time to time, other Iron Planes, made in imitation of this celebrated plane, have appeared upon the market.
These imitation Planes are often put up with numbers and labels designed to make the consumer think that he is obtaining the "BAILEY" Plane.
We are the sole manufacturers of the "BAILEY" Plane. Every Plane has the name "BAILEY" and the number cast in the bottom and the name "STANLEY" is stamped on the cutter.

Always insist that your order be filled with Planes made by THE STANLEY RULE & LEVEL CO., which carry with them a GUARANTEE backed by a Company that has been manufacturing Carpenters' and Mechanics' tools for over half a century.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

doll furniture to be easily moved about in all the rooms of both floors, for it is a real house with "upstairs" as well as "downstairs." The idea of this doll house was conceived by Bird & Son, East Walpole, Mass., as the best way to show the appearance of its line of Neponset products. The sides and roof are of wall board, the roof being of a gray slate color to represent Neponset shingles. This playhouse was offered for a nominal sum and we understand that over 4000 houses have already been delivered.

A New Door Check

There has just been placed on the market a door check embodying constructive features clearly indicated in Fig. 9 which represents a sectional view of the device. For purposes of explanation the component parts have been numbered: 1 being the main shaft; 2, phosphor-bronze bearing on the cams; 3, fifteen-coil torsion type flat wire spring; 4, extra feed chamber; 5, liquid chamber; 6, spring winder; 7, lower cam; 8, shaft; 9, packing; 10, compression spring; 11, piston ring, and 12, piston ring retainer. According to the makers of this device, the Modern Door Check Company, 134 South Clinton Street, Chicago, Ill., the two outstanding features are the torsion type of spring on which the strain is equally divided under all conditions thereby minimizing the possibility of breakage and the vertical liquid chamber which is kept constantly full by the extra feed chamber provided to prevent the door jerking or pounding. The check is also securely packed to prevent leakage, and the automatic take-up and phosphor-bronze bearings are additional improvements in its strength and constructive simplicity. The shaft is supported at the top and bottom and in the center, thus assuring perfect alignment. The phosphor-bronze bearing on the cams carries the load when the door is checked. In this connection the wear is taken up by the spring having a lifting tension, the lower cam being pinned to the shaft, and the spring winder keyed to the shaft, assuring the bearings of pulling together. This prevents jerking or pounding and the door is always controlled smoothly from the time of release until closed. When the turnbuckle arm is lengthened it will allow the main arm to extend beyond right angles and the liquid release becomes operative and gives full spring strength just at the closing point and snaps the latch. The piston ring retainer automatically takes up any wear that may develop on the piston rod. The

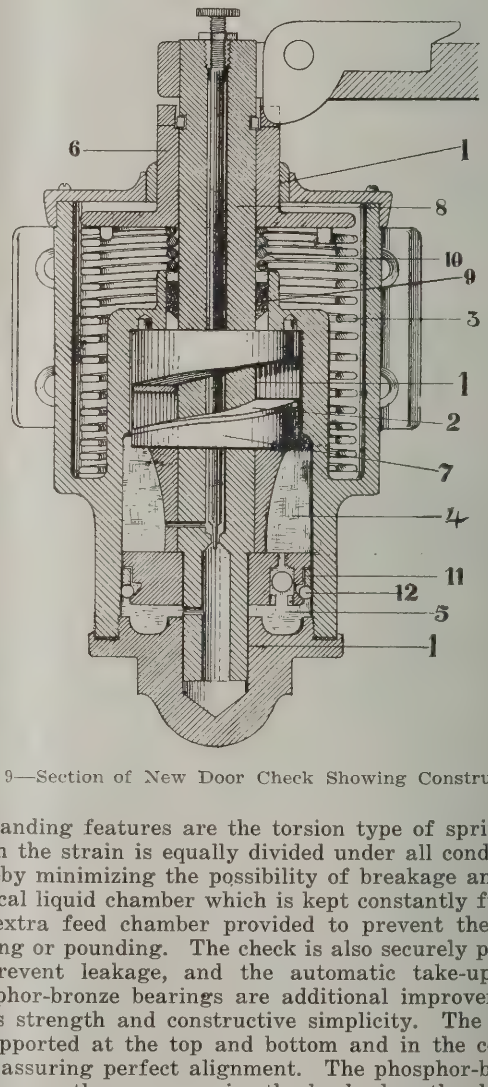


Fig. 9—Section of New Door Check Showing Construction

(*Continued on page* 80)

Ship-plane 4 to 6" Cut.

Broad Axe No. 25-B, 10 to 13" Cut.

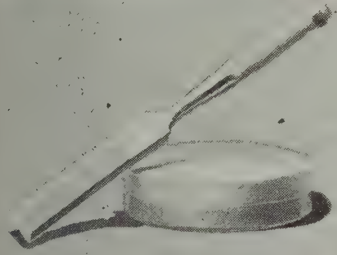
The L. & I. J. WHITE Co.
1837
BUFFALO, N.Y. U.S.A.
L. & I. J. WHITE
1837
BUFFALO, N.Y.

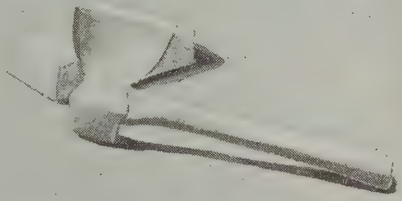
House Carpenter, 4 to 5" Cut.

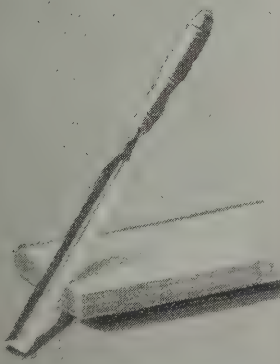
Who Is the Best Judge of Good Tools?

The man that uses them, you bet. It isn't the man who sells them, but the men who use them, who know. WHITE tools are a little higher priced than some others, so are not in all the stores, but insist that they order them for you, or write us direct if you have trouble. Every extra cent that WHITE tools cost is put into quality—isn't that worth while? The next time you buy an adze just try a WHITE and see the difference. They stay sharp twice as long.

The L. & I. J. WHITE CO., 100 Perry Street, Buffalo, N. Y.







It's the Sharp Tool that Lightens the Job

SMOOTH-CUTTING chisels—plane bits that fairly eat away the stock—gouges that do their work in half the time—in fact, every tool on edge keen for the day's work in the kit where there are

Carborundum Sharpening Stones

The round or oblong combination Carborundum stones, coarse on one side, fine grit on the other, should be in every outfit. ¶ There is a Carborundum stone for every edge tool for every sharpening need. *From your hardware dealer.*

BY INVITATION MEMBER OF
NEW YORK U.S.A.

THE CARBORUNDUM COMPANY
NIAGARA FALLS, N. Y.

For Superior Quality and Prompt Service

DISSTON

Superfine Files Hack Saw Blades
Hack Saw Frames

The universal recognition of the superiority of Disston Superfine Files has resulted in a steadily increasing demand throughout the United States for files of our manufacture. We make a large variety, furnishing shapes and cuts suitable for every kind of work for which Superfine Files are used.

We make our own steel, enabling us to control at all times the uniformity of its high quality. This results in a combination of efficiency and durability that cannot be equalled by any other file than a Disston. **Send for price list.**

Hack Saw Blades

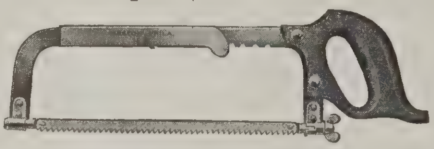
The Disston "Chromol" blades, for both hand and machine use, are hard and tough without being brittle. The teeth are **milled** in and set in such a manner that every third tooth is straight—acting as a cleaner. "Chromol" steel is peculiarly suited for metal-cutting blades, and we guarantee these blades to be more satisfactory than any other blades on the market.

Hack Saw Frames

made after the Disston Patterns and from Disston Materials are the most efficient and durable that can be obtained. Complete catalog, or separate descriptive leaflets on request. The frame shown below is one of the most popular patterns, but we make a large line embracing a wide number of patterns.

We are prepared to give prompt service on shipments.
See your dealer.

HENRY DISSTON & SONS, Inc.
Philadelphia, U. S. A.



The Evolution of the Fireproof Building

The cut tells the story of how the owners of the Leavenworth apartments in Syracuse, N. Y., solved the problem of making their buildings fireproof throughout at low cost.

BERGER'S *Metal Lumber*

7"-4½" joists were used in the floors and roofs spaced 16' center to center, with 14'-0" spans, giving a 35 lb. per sq. ft. dead load. The joists were placed just as soon as the steel beams and columns were ready for them.

Write for our catalog today.

The Berger Mfg. Co., Canton, Ohio

For the best service address nearest branch.
New York Boston Minneapolis
Chicago Cincinnati St. Louis
San Francisco Philadelphia

provision made for packing is a feature especially adopted for the prevention of leakage during transportation. The illustration will show the packing far above the liquid, so that when the check is on the door there is no possibility of the liquid coming in contact with the packing. The door checks are made in three sizes, handsomely finished in gold bronze. They are also supplied with reversible corner, hanging, or flush brackets. The company has issued literature fully describing "Modern" door checks in which is contained a two year guarantee. Copies may be had on application.

The Universal Varnish

As a result of experiments conducted over a prolonged period the Murphy Varnish Company, Newark, N. J., has succeeded in producing a varnish which is suitable for all purposes and which is known under the trade name of "Univernish." This varnish is said to possess qualities which render it proof against turning white either by wetting or scratching, is proof against hot water and steam as well as against alkali soap, alcohol and ammonia. The point is made that it avoids the annoyance and waste incident to the use of two or three varnishes on the same job, and that its characteristics are such as to render it especially desirable by housepainters, furniture manufacturers and others. Another point which might be made in this connection is the weather-resisting power of the varnish and the fact that it does not clog the brushes of the workmen nor thicken in the can.

Convention of Salesmen of F. E. Myers & Brother

The salesmen to the number of 36 of F. E. Myers & Bro., Ashland, Ohio, met in the assembly and display room on the fourth floor of the new office building on the morning of July 28, when the first session of their annual convention was held. F. E. Myers outlined the purpose of the meeting, summed up the results of the business for the past year and dwelt somewhat upon the future prospects. As suggestions to the salesmen, he cautioned them against following beaten paths, pointing out that the dealer must be reached and his custom held through the quality of the goods and the confidence inspired by the salesmen. He cautioned them against mixing politics with business and emphasized throughout his talk the dependence of the firm for its success upon the alertness and ability of its salesmen. P. A. Myers, who spoke more from the standpoint of the maker, said the company had erected a new building every year for the last five years in order to meet the growing needs of the business.

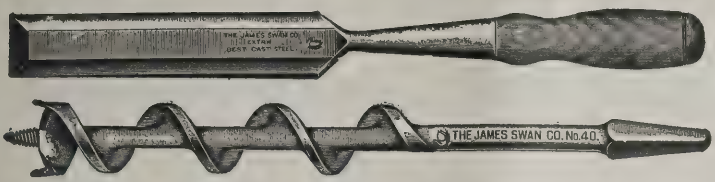
The salesmen remained in town until Friday, during which time there were two business sessions a day besides various features of entertainment. Talks were given by Guy and Ed Myers on the factory and shop; by superintendents G. D. Myers and Dilman Leiter on territory divisions and salesmanship; by John C. Myers on advertising; by F. G. Kellogg on credits and by F. W. Ganyard on the entering and billing of orders. F. E. Harris had charge of the demonstration of the construction of the various tools and the pointing out of their selling points for salesmen.

Shower Baths and the Niedecken Mixer

The great popularity of the "shower" in modern bath room equipment is such that many instances might be cited where the tub is entirely dispensed with. One of the difficulties which has stood in the way of making the "shower" even more popular than it is has been the water control. Various types of shower control valves have been brought out in the past but they have not always proven the unqualified success which was intended. It has remained, however, for the Hoffman & Billings Mfg. Company of Milwaukee, Wis., to bring out a distinctly new type of shower control known as the Niedecken mixer which is referred to as being thoroughly efficient, immediate in action and as giving perfect control under all conditions. The basic principle of this mixer is that of compression work and in its constructing the one aim was to design a valve that would be durable. All the working parts even to

(*Continued on page* 82)

LOOK FOR THE "SWAN" TRADE MARK

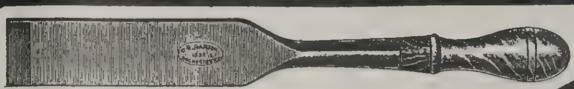


On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.

MACK & CO.



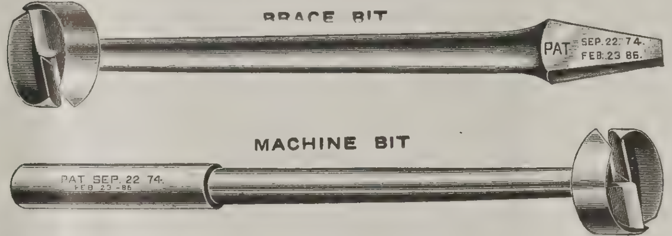
The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

D. R. BARTON 1832 ROCHESTER, N.Y.

Brown's Race
Rochester, N.Y.

THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.



Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

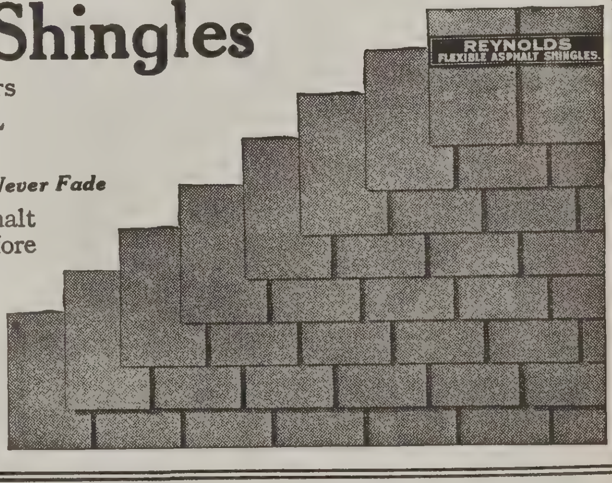
Reynolds Asphalt Shingles

ENDORSED BY LEADING ARCHITECTS

GUARANTEED FOR 10 YEARS—WILL LAST MANY YEARS LONGER

Natural Colors of Garnet, Red, Gray and Green, Which Never Fade

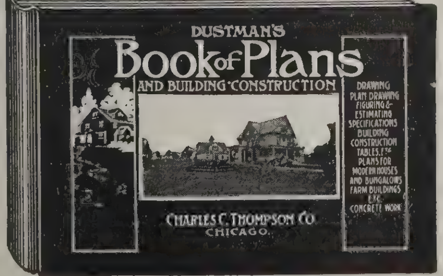
We are the ORIGINAL MAKERS of Flexible Asphalt Shingles and tested our product for ten years before putting it on the market. Let us send you a booklet.



H. M. Reynolds Asphalt Shingle Co.
West Grant Street Grand Rapids, Mich.
Established 1868

Dustman's Book of Plans and Building Construction

By U. P. Dustman



This splendid new book gives a selection of plans and details for 150 moderate priced houses, bungalows, barns, etc., of brick, frame and concrete construction that will prove of exceptional value to those who intend to build or have occasion to prepare plans.

Of far more interest to many, however, is the section on up-to-date building operations. This clearly outlines the most successful and economical methods now in use and is based on the author's thirty years' experience.

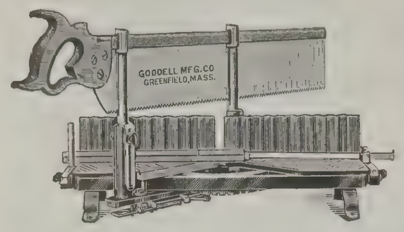
240 Pages, 9 x 13 Inches
150 Plans and 175 Diagrams
Price, $2.00, Delivered

BUILDING AGE BOOK DEPT.
239 West 39th Street NEW YORK

Goodell Mitre Box

Made of STEEL—Cannot Break

For years this Box has been recognized as being *first in quality and improvements,* and the new STEEL BOTTOM PLATES with ANGULAR SERRATURES to prevent the work from slipping add still more to its convenience and attractiveness.


GOODELL MFG. CO. GREENFIELD, MASS.

Write for new *Circular K* describing this and many other features.

GOODELL MFG. CO.
Greenfield, Mass.

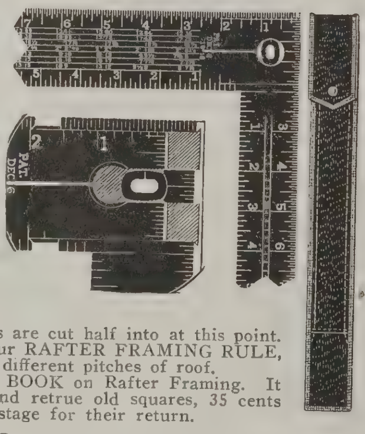
How Long Do Your Files Last?

Does it seem that the files your men are using wear out as fast as you buy them? Why not try a file that is manufactured from a superior brand of steel by practical skilled file cutters? One dozen of our XX Taper Files will outwear two dozen of any other make of taper files. They won't cost you any more and they'll last twice as long.

From your dealer or direct.

Moore Brothers
Jamestown, N. Y.

Nicholls Expansion Fit Take Down Square No. 500 R



Eccentric Cam expands end of body in milled portion of tongue, making an absolutely solid joint also taking up wear Long bearings assure accuracy.

Strength where tongue joins on to body. All other Take Down Squares are cut half into at this point. These are stamped with our RAFTER FRAMING RULE, giving cuts for seventeen different pitches of roof.

Send for our LITTLE BOOK on Rafter Framing. It is FREE. We refinish and retrue old squares, 35 cents each. Include enough postage for their return.

NICHOLLS MFG. CO. **Ottumwa, Iowa**

BONDED RED DEVIL BONDED

Chisels, Gouges, and Drawing Knives

Are backed by an Insurance Bond that is packed with each tool. That Bond removes all the doubts and questions of that much-abused "guarantee."

The bond means tools that have received the same care in manufacture as is given high grade razors—careful analysis, careful tempering, careful hand honing and setting. The handles, too, are made to fit properly. If your dealer can't supply, send 50 cents for sample Red Devil Bonded No. 2622, 1 in. beveled, socket firmer, pocket chisel, and booklet of 3000 Red Devils.

Send for booklet anyhow.

Smith & Hemenway Co., 158 Chambers St., New York, N.Y.

the valve seats can be readily replaced should it become necessary after years of use. In action the valve is such as to make changes in temperature very gradual. Starting with cold the temperature can be slowly increased until the desired degree is reached. The cold water is first admitted and hot water gradually added. As the hot water increases the cold water is reduced, thus rendering the device economical in operation. One of the most essential points of this mixer is the anti-scalding feature. Provision is made in the valve whereby it is possible to set it to a pre-determined maximum temperature, thus preventing scalding, and this every one will agree goes a long way toward popularizing the shower bath. The company has issued a very attractive catalogue of 36 pages entitled "Showers with Niedecken Mixer" and within its covers various combinations are illustrated and described.

Smith Concreting Appliances

An illustrated folder sent out by the T. L. Smith Company, Milwaukee, Wis., relates to the "Smith Concreting Appliances" and is of a nature to interest all builders engaged in doing concrete work of any kind. Special attention is called to combined hoisting and mixing rigs, rotary screens, concrete chutes, all-steel door elevators, etc., etc. Another illustrated folder is devoted to the Chicago Paver, the 1914 model of which has been changed somewhat to more fully meet the requirements of the paving contractor. The rotary distributor is now 18 ft. in length and two heavy channels extending out from the truck sills form a strong support. At the outer end of the distributors these channels are attached to a bearing ring encircling the pipe. The machine is also equipped with the company's improved discharge chute. Larger wheels have been provided for the truck giving a clearance of 14 in. which is said to be sufficient to clear any manhole or other obstruction. The front wheels are mounted on a stationary axle being pivoted in the same manner as automobile wheels.

"Simplicity" Gas and Gasoline Engines

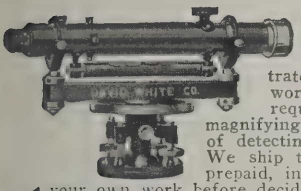
Some interesting information as to just how "Simplicity" gas and gasoline engines are designed and built is contained in a catalogue of 48 pages profusely illustrated, sent out by the Turner Mfg. Company, Port Washington, Wis. Engines of this character are adapted to a great variety of purposes and some of the many uses to which they may be advantageously put are set forth in the literature before us. Special reference is made to portable saw rigs, concrete mixers, wood sawing outfits, power trench pumps, etc., etc. In connection with the many illustrations is to be found a brief description together with tables which are in the nature of specifications. The "Simplicity" is made in a great variety of styles and sizes, running all the way from 2 to 20 horse power, and in the stationary, skidded, portable, battery and magneto types. It is built for hard service and is referred to as simple, durable, reliable and economical.

The Pearson Shingle Nailer

For the purpose of meeting a well defined demand for its Shingle Nailing Machine the Pearson Manufacturing Company, Robbinsdale, Minn., is now offering the tool in such a size and weight as to render it even more convenient, if such a thing were possible than ever before. In fact, it is now made so small and light that it can be readily carried in the coat pocket of the building mechanic. The shape of the nailer is such as to be always practical for any pitch of roof or level surface where a 3d wire nail is used. The company states that experience has proven that the Pearson Nailer is used to great advantage in renailing old shingle roofs for by putting in a new shingle here and there an old roof may be made to last for many years to come. The company also manufactures Tackers in which can be used 4, 6, and 8 ounce wire tacks. These machines are made on the same principle as the nailers and are used for tags, screens, canvas, sheet iron, etc., the machines being referred to as very handy for these purposes.

(*Continued on page* 84)

WHITE'S IMPROVED LEVEL

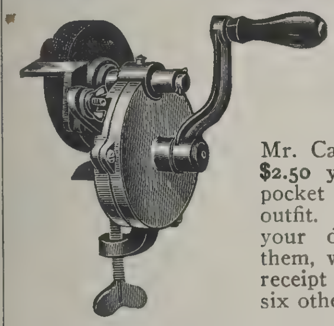

DAVID WHITE CO.

Shipped on Approval

Our No. 2011 improved level, illustrated herewith, is especially designed for work where a general purpose level is required. Telescope is 12" long with magnifying power 25 diameters and is capable of detecting an error of 1/16-inch in 300 ft. We ship this level out on approval, express prepaid, in order that you may try it out on your own work before deciding to keep it. Ask for particulars and catalogue illustrating Builder's Levels and Transits at a wide range of price. Ask today!

David White Co., Dept. B, 419 E. Water St., Milwaukee, Wis.

No. 0 PERFECTION



Our vest pocket edition for Carpenters, Plumbers and households; fitted with 4-inch Corundum Wheel. Weight 5 lbs.

Mr. Carpenter, just think for **$2.50** you can carry in your pocket a complete sharpening outfit. No dirt—no grease. If your dealer does not carry them, we will send prepaid on receipt of price. We also make six other sizes.

STAR SPECIALTY MFG. CO.
227-233 W. Erie St., Chicago

"Sterling" Convertible Level

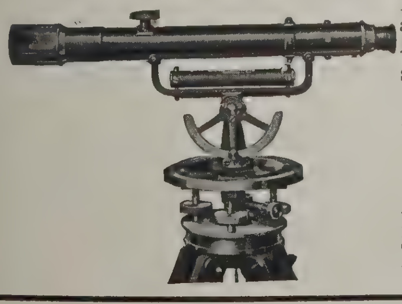
The compact reinforced construction of the 1915 model adapts it particularly to the needs of the Builder and Architect. No special skill or training is required in its use! It possesses features of advantage worth knowing about! Write **today** for details of **Free Trial Offer**, price, terms, etc., of **the instrument you will ultimately select.**

We **Repair** and **Adjust** all makes of instruments, **tape lines,** etc., and take old transits and levels in exchange.

Warren-Knight Co.
136 N. 12th St. Philadelphia, U. S. A.

The Yankee (A Compound Level)

Just the thing for the Arch.-Builder
An accurate level for moderate cost



Runs Horizontal and Vertical Angles.

Sold guaranteed by

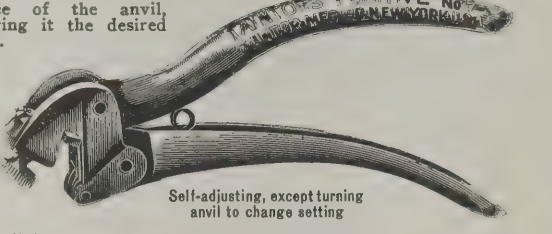
Frost-Adams Co.

37 Cornhill, Boston, Mass.

Write for our catalogue of books for Carpenters, Builders, Architects, etc.

DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.


TAINTOR'S POSITIVE No
TAINTOR MFG. CO. NEW YORK U.S.A.

Self-adjusting, except turning anvil to change setting

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.

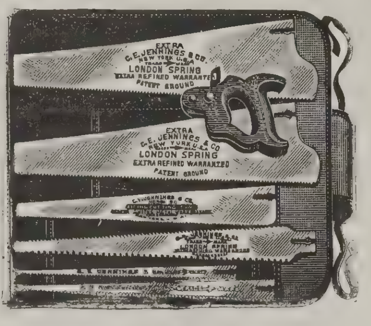
Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., New York

C. E. Jennings Arrow Head Combination Sets of SAWS

Adjustable Handle



No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set In a Box or Leather Case If So ordered Extra.

We will send a set by parcel post if your dealer cannot supply you.

Send for circular.

Sole Manf's

C. E. JENNINGS & CO., 71-73 Murray St., New York

Pearson's Automatic Shingle Nailer

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only **$5.00** It makes good.

Pearson Mfg. Co.
Robbinsdale, Minnesota

SEND $1.00

for this

remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending $1.00 for this attractive offer. We prepay postage.

Otis A. Smith Rockfall, Conn.

CON-SER-TEX
THE IDEAL COVERING FOR SLEEPING BALCONIES PORCH FLOORS AND ROOFS
CON-SER-TEX

Con-ser-tex

solves all roofing problems

What is Con-ser-tex? It is a canvas roofing, chemically treated to preserve the fibre from the mildew and the detrimental action of the oil in paint.

What Are Its Uses? It is used for Porch and House roofs, piazza floors, sleeping balconies, bathroom walls and floors, kitchen floors and all other places where a serviceable fabric is required.

Does It Do the Work? It never rots or stretches. It hugs the porch or roof surface tightly. Neat and artistic appearance. It deadens sound, is waterproof and weatherproof. Defies treading, coal gas, or any other wearing influence.

Does It Cost Much? Con-ser-tex is very inexpensive. Cheaper than most other roofing materials. It is easy to put on—thus saving time and eliminating trouble for the carpenter.

Anything Else? Yes, we will send you a sample of this wonderful fabric. A moment's investigation will show you its superiority over Cotton Duck and other roofing fabrics. We will also send you descriptive folder and price list.

Wm. L. Barrell Company
8 Thomas Street, New York City

Chicago Distributor: Geo. B. Carpenter & Co., 430-40 Wells St.

California Distributors:
Waterhouse & Price Co., Los Angeles
The Pacific Building Material Co., San Francisco

Broncho Line of Concrete Mixers

An illustrated folder of somewhat liberal proportions printed in two colors and describing at length the 1914 models of the "Broncho" Batch Concrete Mixers is being distributed among builders, contractors and concrete users generally by Lansing-Company, Lansing, Mich. The point is made that this model mixer is not too large for the small contractors nor is it too small for the big contractors. It is constructed of steel, is low charging, mixes quickly, is readily dumped and easily cleaned. The company gives a two-year guarantee against wear and defects and the name is adopted from the famous western Broncho known the world over for its strength, speed, endurance and practically unbreakable disposition. The folder also carries tables showing capacities, weights, motive power and dimensions of the various sizes which are manufactured.

Sample Brass Screw Holes Free

In our issue for August attention was briefly directed to Stine's brass screw holes for which many claims are made. In Fig. 10 we show the device and the way in which it operates. The screw holes have a varied utility and will be found convenient for use in places where screws would ordinarily pull out or be difficult to drive. The type shown in the center illustration is intended for use with wood screws. The container is so shaped that it can be driven into soft woods or applied in hardwood in the same manner now used in connection with driving screws. The shape of the shell is such as to grip the wood so that the screw hole will not turn nor pull out easily. The type shown in the left illustration is the reverse of the one just described. The inner receiving end is beneath the surface of the wood and the screw enters from the opposite side instead of the face of the receiving material. The driving head is shown in the illustration at the extreme right hand. For the purpose of enabling prospective purchasers to see just what is offered and at the same time make a personal demonstration of its merits the Stine Screw Holes Co., Review Building, Decatur, Ill., offers to send a free sample to any one who may request it.

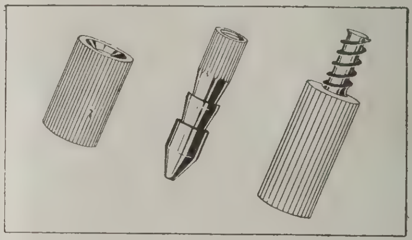


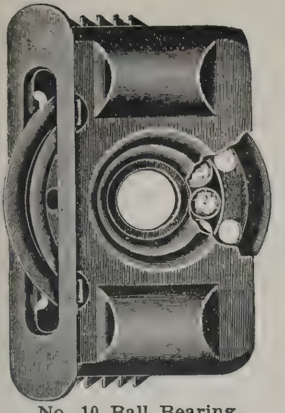
Fig. 10—Details of the Stine Brass Screw Holes

TRADE NOTES

The Arkansas Soft Pine Bureau, 1736 Transportation Building, Chicago, Ill., has about ready for distribution an interesting little work entitled "Uses of Arkansas Soft Pine for Building" and suggests to readers of this paper that they send for a copy of it. The bureau points out that the contractor's home should be a living advertisement of his knowledge of building material values as well as of his skill and ability in assembling them. It is said that contractors familiar with the merits and economies of Arkansas Soft Pine use it when they build houses for themselves.

Roberds Manufacturing Company, 101 Railroad St., Marion, Ind., briefly describes in another part of this issue its method of co-operating with contractors' agencies handling the Roberds Ideal Wall Boards. The company points out how to make two profits instead of one and give the customer a better job.

(*Continued on page 86*)



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Fasten automatically. No nails. No screws. Just bore 4 holes.

The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

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Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

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5 Jones St., Rochester, N. Y.

Something For You

in our Pamphlet 29; viz: Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and a Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

When a Wall Tie is a Wall Tie it is the Whalebone

Made in any length from five inches to fifteen inches. Standard size for Solid or Veneer walls 7 inches by ⅞ inches, weighing 50 pounds to the M. Packed 1000 to the box.

Price on standard size, based on 21 gauge material, $2.50 Pittsburgh per M. Shipments made same day order is received.

Can quote on lighter or heavier material if desired, as we can supply the Standard Whalebone in boxes weighing from 35 pound to M to 85 pound to M, according to thickness of material.

Allegheny Steel Band Co.
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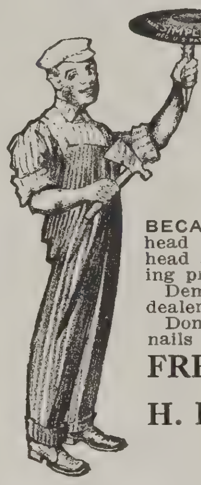

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FOUR NAILS at PRICE OF ONE
when you buy them
ONE NAIL in Place of FOUR
when you drive them

BECAUSE the Simplex has four times the head area of an ordinary roofing nail, and head area is the all important point in laying prepared roofing or sheathing papers.

Demand Simplex nails from your hardware dealer.

Don't buy prepared roofing unless Simplex nails are packed in the rolls.

FREE Samples sent on receipt of request accompanied by dealer's name.

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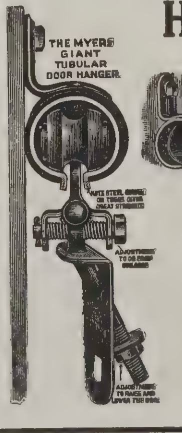
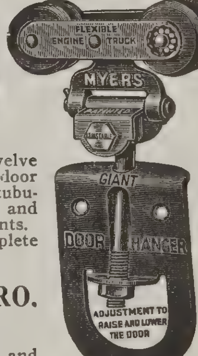
PATENTED


THE MYERS GIANT TUBULAR DOOR HANGER



This is one of twelve different styles of door hangers for flat or tubular track with lateral and perpendicular adjustments.

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ASHLAND, OHIO

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1853 BUCK BROS. 1914

BUCK BROS

Buck Brothers Tools are LASTING tools—they keep their edge.

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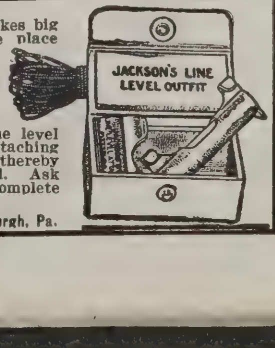

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Don't cut holes in the storm-window frames—Hang them from the top with **Gossett Hinges.** Then you can swing them out at the bottom for ventilation. Special Fasteners lock them securely opened or closed.

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ONLY SELF-SETTING PLANE

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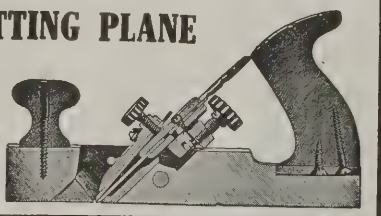


"NOTABLE Buildings" is the name of a Dixon booklet. It is a list of prominent structures of all kinds located in all parts of the country protected with

DIXON'S SILICA GRAPHITE PAINT

Would a copy interest you? Ask for Booklet 32-B.

Made in Jersey City, N. J.
Joseph Dixon Crucible Co.
ESTABLISHED 1827

WANTED—Manufacturers' Agents now calling on architects, contractors, etc., can secure a valuable agency for well established house. To right man we will give a liberal commission contract, turn over customers, leads in territory and co-operate in getting new business. Want men who can build up and hold a wholesome, staple business. For full particulars, address "A. C.," care *Building Age*, New York.

WANTED—One large specialty or supply house in every city to act as our distributor for the best Flat Enamel Wall Finish on the market. We have been successfully marketing this for three years to the large consumer, but now want a strong supply house to represent us in each city. Will offer splendid profit and co-operate in the sale in your territory. For full details address "A. S.," care *Building Age*, New York.

The Silver Manufacturing Company, 350 Broadway, Salem, O., has issued a catalogue which illustrates and describes a new line of wood working machines made especially for those who desire high grade quality for the money invested. The catalogue is known as No. 60 and illustrates jointers, band saws, swing saws, and two styles of saw tables.

Baxter Brothers, contractors and builders, Huntsville, Ala., desire prices on concrete mixer and portable saw rig, each machine to be furnished with gasoline engine. Manufacturers of these goods who advertise in *The Building Age* should take due notice.

The leading topic in the August issue of the *J-M Roofing Salesman* published every 30 days by the H. W. Johns-Manville Company, Cleveland, Ohio, is the recent Salem fire and the resistance to the further spread of the flames which was offered by buildings covered with J-M asbestos roofing. The point is made that one of the most remarkable demonstrations of the fire-resisting properties of this material was found at the site of the Naumkeag Steam Cotton Company, whose plant consisted mainly of brick and so-called fire proof construction. Only two buildings were left standing—one a reinforced concrete storehouse and other a raw cotton store building, the roof of which in 1911 was covered with "Wide Top" three-ply Brooks brand J-M Asbestos Prepared Roofing. The statement is made that although covered with sparks, cinders and embers from the other mill buildings ablaze on three sides of it this structure escaped without damage. Buildings in other sections of the city covered with the same make of roofing also offered resistance to the fire.

The American Saw Mill Machinery Company, Hackettstown, N. J., has just completed an additional building at its plant in which it has installed a sand cleaning equipment for the foundry.

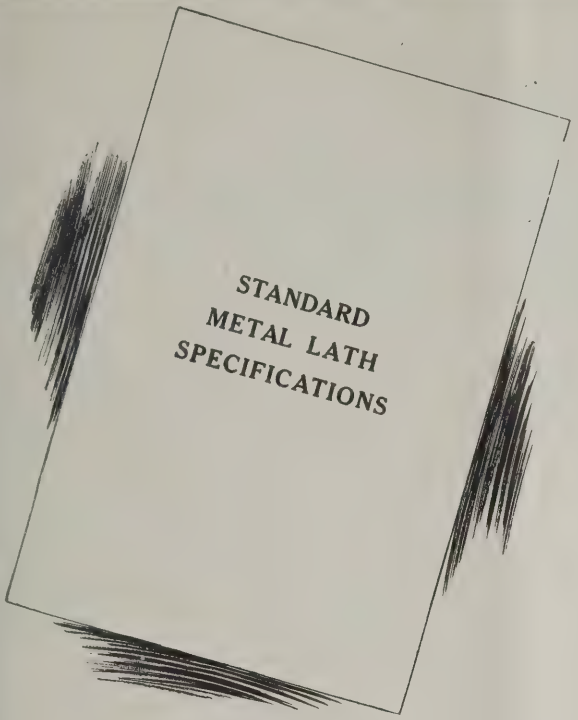
A recent issue of the *Abrasive Age*, the house organ of the Carborundum Company, Niagara Falls, N. Y., contains as its leading article an illustrated description of a new and improved heavy face grinder now manufactured by the Diamond Machine Company at Providence, R. I. There is also an article entitled "An Insight to the Marble Industry," while another deals with the "Grinding Wheel in the Lumber World." There is more or less interesting matter relating to Carborundum Wheels and other products of the Carborundum Company.

The card calendar for August sent out by the Richards-Wilcox Mfg. Company, Aurora, Ill., carries a bathing scene as its panel picture. Conspicuous among the printed text is the statement "A hanger for any door that slides."

Among the many important contracts which P. & F. Corbin, New Britain, Conn., have recently secured is that for furnishing the hardware for the new Adams Express Company's building in lower Broadway. This it will be recalled is a 32-story structure extending through the block to Trinity Place, the architect being Francis H. Kimball, well-known to readers of this journal. Another large builders' hardware contract recently obtained by the company is for the Western Union building at Broadway and Dey Streets and which with the contract for the builders' hardware trim to go into the new Equitable Building, New York City, mentioned in these columns at the time it was secured some months ago, constitute the largest being put through at present in this city for builders' hardware.

We understand that the Pike Mfg. Company, Pike, N. H., has decided to establish Pike sharpening depots all over the country, this procedure being intended to establish a service to users of edged tools that will be of great benefit. In this connection it is interesting to note that the present completes the ninety-first year of the company's existence.

(*Continued on page* 88)



This is *Not* an Advertising Booklet

"Standard Metal Lath Specifications" contains the correct method for building walls and ceilings on *any kind of metal lath* as a base for *any kind of plaster or stucco.* It contains no trade marks, firm names or selling talk of any kind. The specifications were compiled from data obtained from experts and successful workmen. That's why we can assure you that they are standard and correct.

These specifications tell you just the proper size for supports and how to space them, both on suspended ceilings and for ornamental work, just how best to attach supports to roof and floor construction; just how to put on the metal lath and just what weight of lath to order to get a stiff material to plaster on.

Profuse illustrations show the methods of construction recommended in detail. You need this book in your work *every day.* It is yours for the asking. Simply write the

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Efficient, Economical, Rigid
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GET THEM**

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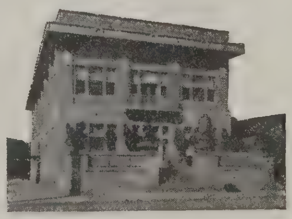

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Elevate Your Business with the
"BLAKE ELEVATOR"
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Belt Power Elevators
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State your requirements and an interesting proposal will promptly come.
Blake Elevator Mfg. Co., Sidney, Ohio

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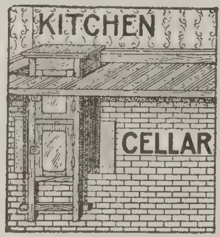

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During Fall and Winter Months.
Big Money; Ready Seller.
Sanitary Automatic Dumbwaiter
saves carrying food to and from the cellar. Perfectly ventilated; screened openings; finished inside with durable white enamel. Keeps food perfectly. Top lies flush with kitchen floor. You can walk over it. Operates with push button or lever. Also furnished as a Refrigerated Dumb Waiter. Cost of installation is NOMINAL. Write for new catalog just out.
York Automatic Dumbwaiter Works
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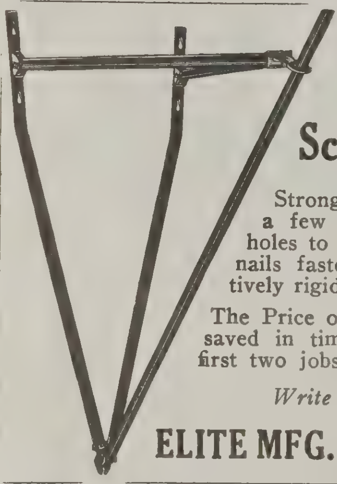

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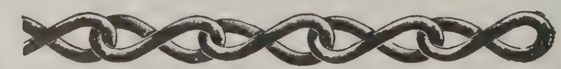
FOLDING
Scaffold Bracket
Strong and safe; requires only a few minutes to attach. No holes to bore. Four 10-d or 16-d nails fasten them securely. Positively rigid; no vibration.
The Price of these Brackets can be saved in time and material on the first two jobs.
Write for Circular C.
ELITE MFG. CO., Ashland, O.

The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.
Sash Chains

Cable Chains

Jack Chains



Manufacturers of "GIANT METAL" Sash Chains
Manufacturers of "RED METAL" Sash Chains, Cable Chains, Jack Chains, Bell Hangers' Chains and Plumbers' Chains. Made in Brass, Copper and Steel.
WRITE FOR CATALOGUES AND PRICES.

We are the ORIGINATORS of SASH CHAIN as SUBSTITUTE for sash cord. In use over thirty years. Capacity of our chain plant 30 miles per day.

Durametal Weatherstrip Company of 12 East Austin Ave., Chicago, Ill., is directing the attention of contractors, builders, carpenters and house owners generally to the advantages of Durametal weatherstrips. The season is rapidly approaching when doors and windows will require weatherstripping and the company feels that the present is a good time to emphasize the merits of Durametal strips for the purpose. The strips are made of heavy zinc, are durable and easy to install. The company states that a few agencies are open to responsible builders and carpenter-contractors.

Hecla-Winslow Company, makers and designers of ornamental iron and bronze work, 101 Park avenue, New York City, are distributing an attractive booklet illustrating and describing the Winslow window which is designed to meet the demand for fireproof and durable solid steel windows for office buildings, libraries, hotels, schools, banks, hospitals, etc. It is referred to as "an entirely new type of one-plane solid steel window with Austral balance." It has been thoroughly tested for weather-tightness, practicability, operation, etc., and only the highest grade of materials are used in its construction. It is said to be easily adapted to the requirements of any type of construction of building, old or new. The window has been specified for the new Equitable Building, now in course of erection in lower Broadway, New York City, and which will require 5000 Winslow windows.

National Sheet Metal Roofing Company, 339 Green St., Jersey City, N. J., has issued an announcement calling attention to "What Inflammable Roofs Did for Salem" in the great fire which visited that historic city on June 25 of the present year, burning over 295 acres, destroying 20 large factory plants and over 1000 homes and other buildings. The company takes this occasion to call attention to the time tested Walter's and Cooper's Metal Shingles and presents a picture of houses ten feet apart in the district visited by the fire, showing the fireproof value of buildings covered with the shingles in question.

The Beaver Board Companies, with headquarters at 244 Beaver Road, Buffalo, N. Y., call attention to the fact that the carpenter who understands Beaver Board construction is in a position to take advantage of the steadily growing demand for this wall and ceiling covering. With Beaver Board the carpenter can work the entire wall or ceiling himself, and thus secure credit for the beauty of the finished interior. In order, however, to obtain the best results with Beaver Board it is necessary to know how to put it up. This can be ascertained through the Companies Builders' Service Department which will keep the carpenter and builder posted on every phase of Beaver Board construction. Copies of the literature which will be sent him upon request may open a new field of profit for him in the construction of walls and ceilings.

The Alpha Portland Cement Company, Easton, Pa., is sending out a very attractive catalogue relating to its product, the text being printed in Spanish. It is illustrated by numerous half-tone pictures, some of which show the company's plants at Alpha, N. J.; Mountain Creek, Pa.; Manheim, W. Va., and Cementon, N. Y. A beautiful double page group of pictures show 8 bridges in the construction of which Alpha Portland Cement was used.

"Story of the Table That Went to Bed" is the title of a *brochure* printed in colors which has been issued by the Finney-Ennis Company, 332 South Michigan Avenue, Chicago, Ill., and which tells how a library table may be readily converted into a perfect bed. When folded and enclosed in the base of the table or otherwise, both mattress and bedding stand 21 in. above the floor, which prevents the accumulation of dust from beneath. The point is made that the table-bed, as it is called, is very compact, easily operated, durable, sanitary and comfortable. It is ideal for emergency cases and is said to "forever settle the spare bedroom problem." The illustrations are in colors and four of them show the four motions necessary for converting the table into a bed.

THE BUILDING AGE

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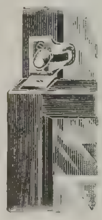

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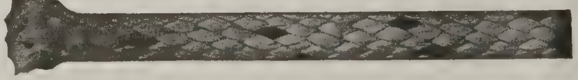

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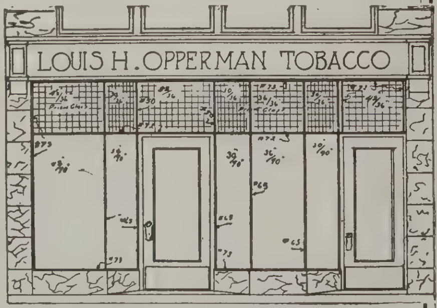

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The Building Age picks out well-built and well-designed houses for its illustrations, and they almost always find that these houses have been stained with Cabot's Stains.

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the houses that have been stained with
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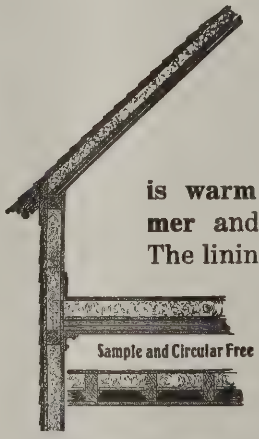

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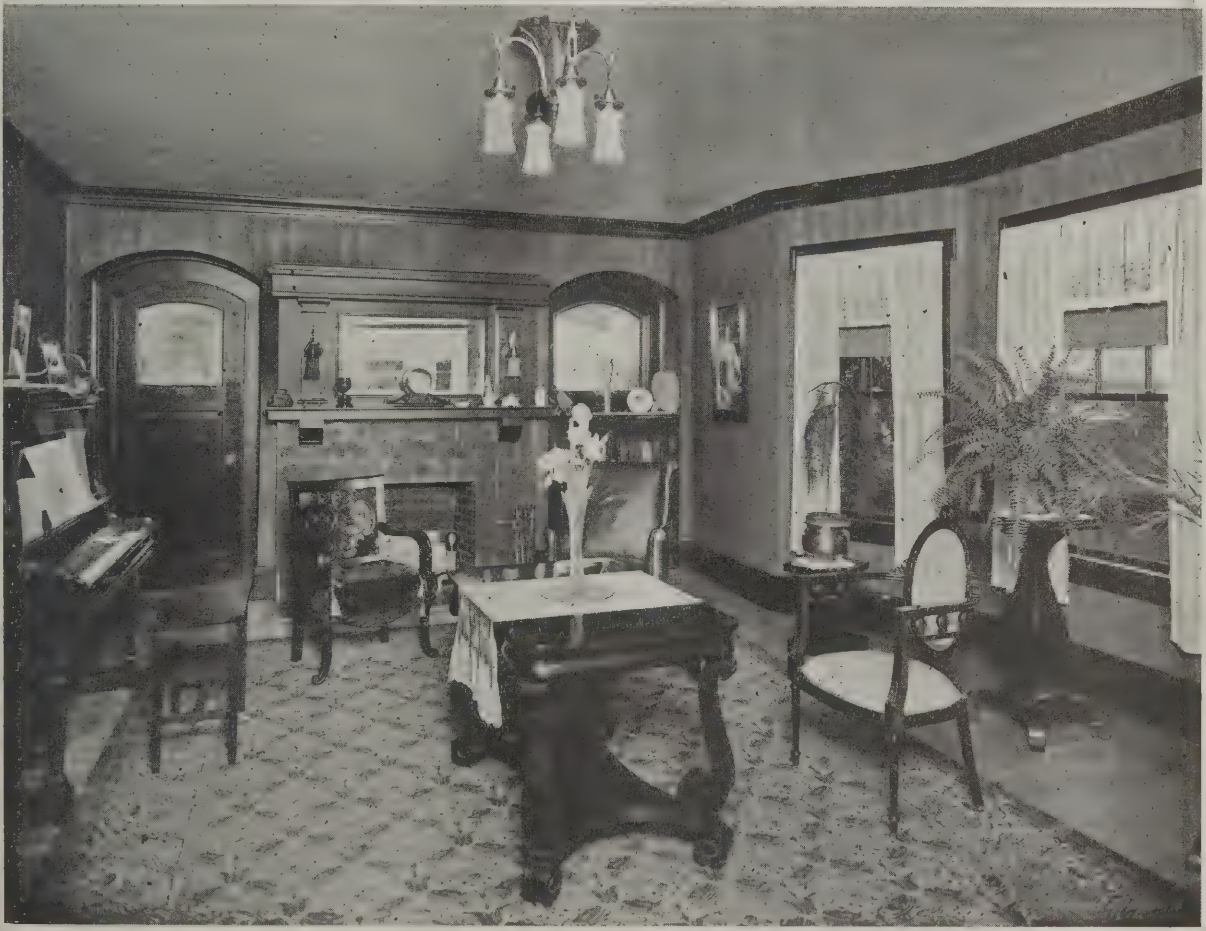
THE BUILDING AGE

NEW YORK, OCTOBER, 1914

A Picturesque Design for the Lakeside

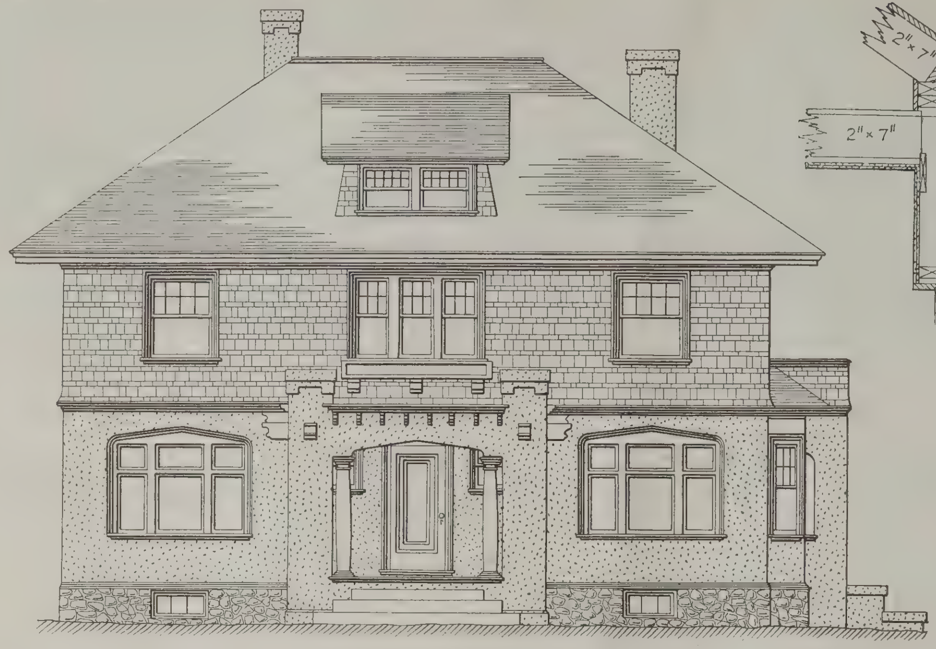
A Dwelling House in Which the Greenish Hue of the Stucco and Shingled Walls Blends with a Roof of Slate

DELIGHTFULLY situated in one of the new suburban residential sections of which the city of Worcester can boast and overlooking Indian Lake, one of a large number of picturesque sheets of water to be found in the New England states, is the charming dwelling which forms the basis of the illustrations presented upon this and the pages which immediately follow. The spacious grounds extend from the main thoroughfare a distance of about 500 ft. with a gentle slope to the edge of the lake. The house is situated back about 100 ft. from the street, thus affording ample opportunity to view the building and its well kept grounds from all directions.

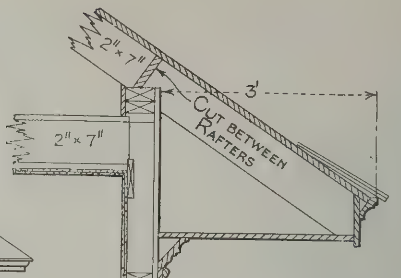


View in the Living Room of the Charming Residence of Mr. Nils Bjork Overlooking Indian Lake—Architects John P. Kingston & Son, Worcester, Mass.

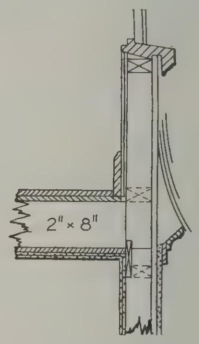
The house is of balloon frame construction, thoroughly braced, with exterior walls and roof covered



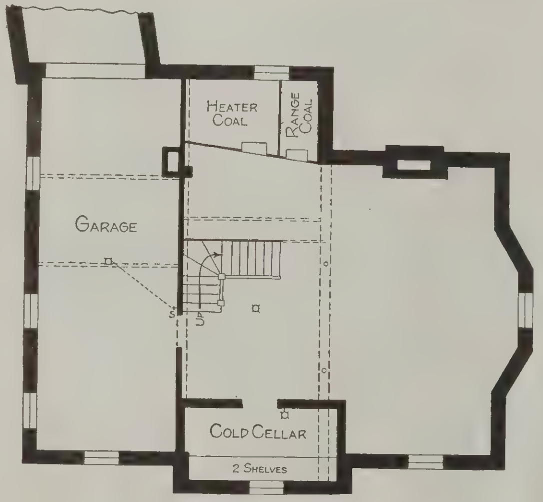
Front Elevation Showing the Shingle and Stucco Effects—Scale 3/32 In. to the Foot



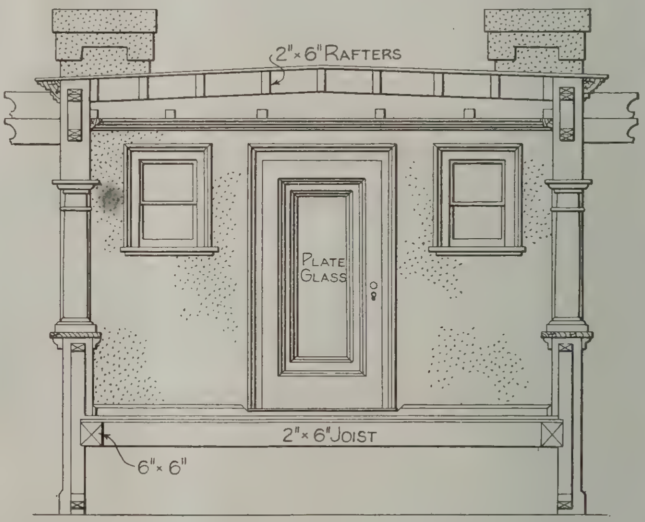
Details of the Main Cornice — Scale ⅜ In. to the Foot



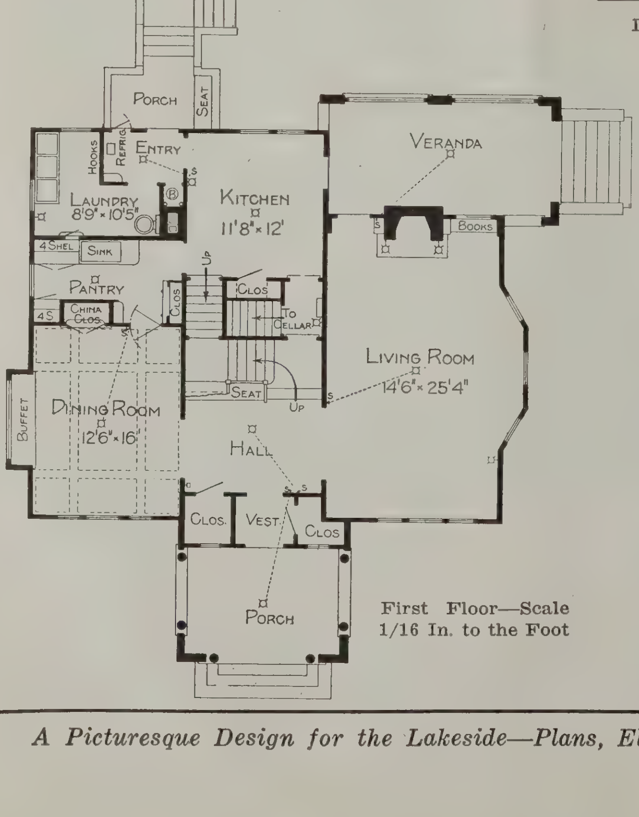
Detail of the Belt Course — Scale ⅜ In. to the Foot



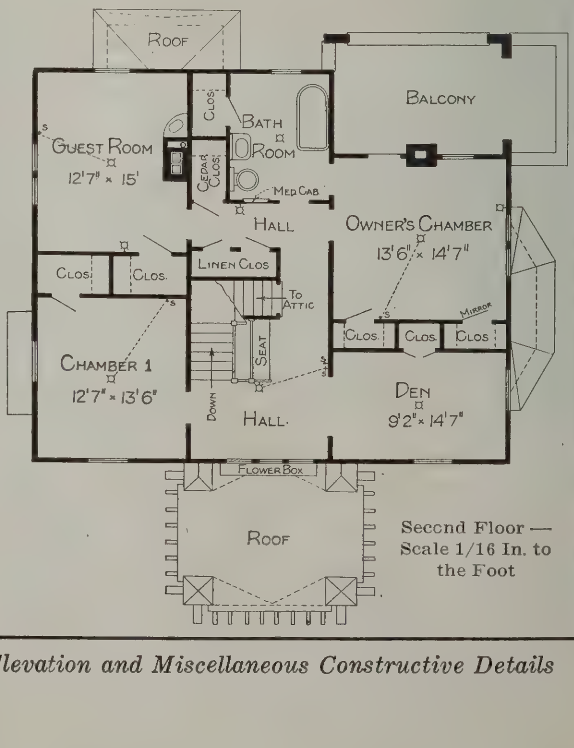
Foundation, Showing Position of the Garage—Scale 1/16 In. to the Foot



Detail of Front Porch, Showing Constructive Features—Scale 3/16 In. to the Foot



First Floor—Scale 1/16 In. to the Foot



Second Floor — Scale 1/16 In. to the Foot

A Picturesque Design for the Lakeside—Plans, Elevation and Miscellaneous Constructive Details with matched spruce boards. The sheathing boards at the second story above the belt course are covered with shingles laid in alternate courses of 3 and 7 in. exposure to the weather. The first story has two coats of stucco plaster finished with a fairly rough "splatter dash" coat. This stucco work is done over No. 19 gauge Clinton galvanized woven wire lathing fastened to 3/8 by 7/8 in. furring strips spaced 12 in. on centers and put on vertically over the sheathing paper and boarding. The scratch coat consisted of a mixture of one part lime and hair mortar, two parts Portland cement and two parts sharp sand, this being well pressed through the lath so that the latter is entirely embedded in the mortar. The second coat was mixed in the proportions of about 100 lb. of lime putty, one barrel Portland cement and two barrels sharp sand. This was put on and filled out to the grounds or face of the frames which are 1⅛ in. thick so that the full thickness of the plaster is about 1⅛ in. When this was done the mouldings, which are shown around the sides and tops of windows and door frames were put on, lapping them out over the plaster ½ an inch. After this the splatter coat was put on, the mixture consisting of one part Portland cement, two parts sand and coloring matter to suit.

The roof boards are covered with slate of an unfading green hue, which harmonizes well with the shade of the stucco and shingles on the exterior walls. The exposed underpinning walls are of rough weathered field stone having deep wiped out joints, while the foundation walls are done with field stone, the interstices being mortar filled and all parts whitewashed inside.

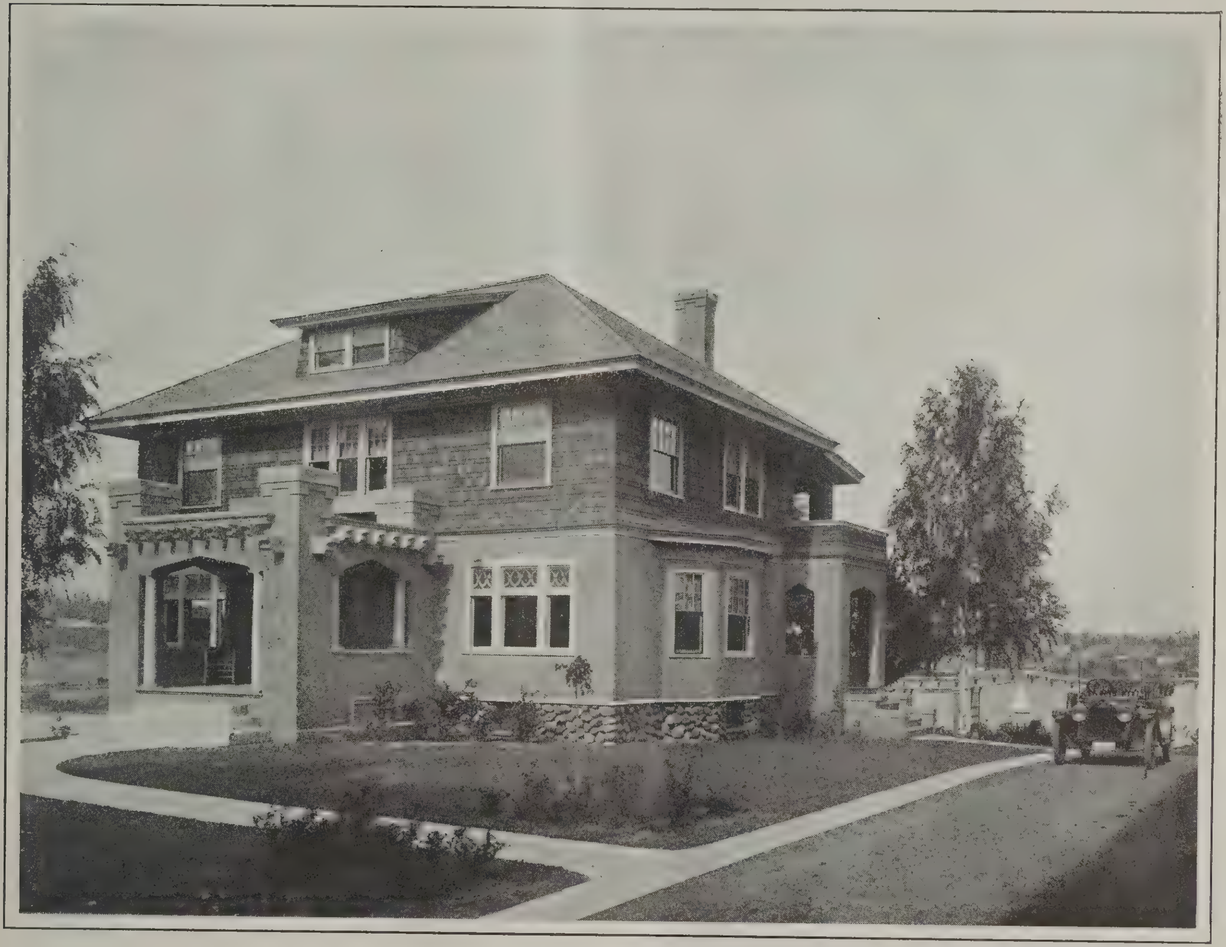
As the best view from the house is gained from the rear the front porch extends only about one-third the length of the frontage, serving simply as a protection for the main entrance. This porch is of stucco plaster with a roof of pergola effect, which gives a very attractive entrance as may be seen from an inspection of the detail upon another page.

At the rear of the house overlooking the lake and one of the suburbs of the city with its distant hills is a spacious veranda, and over it is a balcony screened in, both being easily accessible from the rooms adjoining.

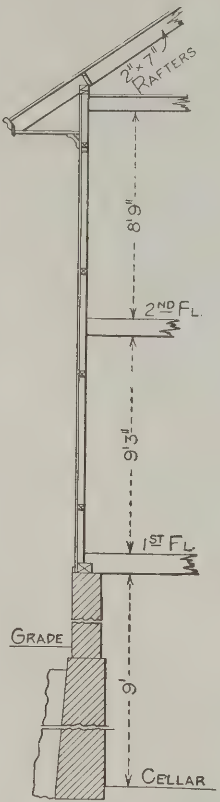
At the rear north corner of the house is the entrance to the garage or automobile room, which occupies a goodly portion of the basement space. The wooden walls of the garage as well as the ceiling are covered with metal lath and plastered, while the doors connecting with other parts of the basement are tin clad. The remaining portion of the basement is used for boiler room, cold storage and general purposes.

The girders under the center of the house are 8 x 8 in., the sills 4 x 7 in., the corner posts 4 x 6 in., the first floor joist 2 x 9 in., the second floor joist 2 x 8 in., the third floor joist 2 x 7 in., the rafters 2 x 6 in. and the studs and braces are 2 x 4 in. The braces are used in all exterior corners and interior partitions where desirable.

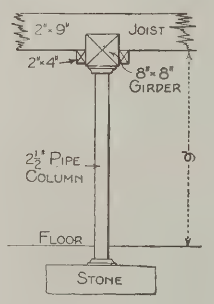
Entrance to the main floor of the house is through a vestibule, opening out of which is a convenient



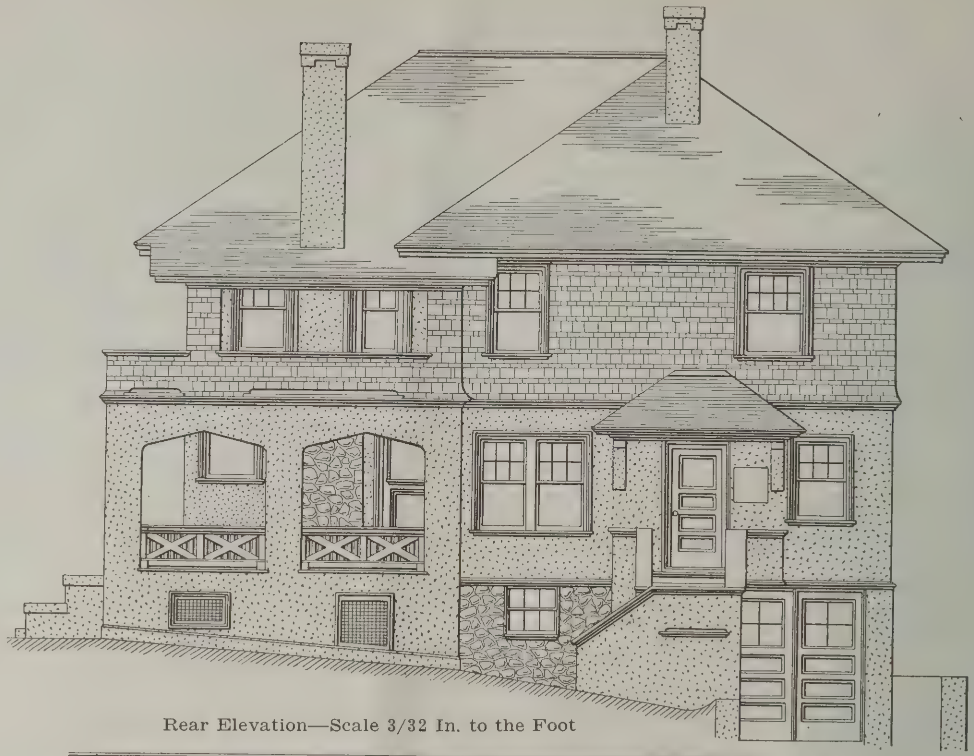
A Picturesque Design for the Lakeside—Exterior View of Home of Mr. Nils Bjork on Indian Lake, Mass., Showing Its Delightful Location and Charming Environment



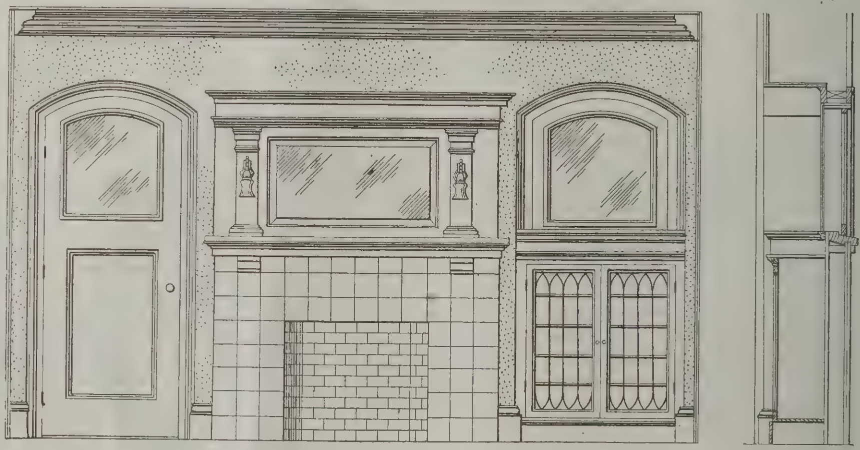
Section Showing Hight of Stories in the Clear—Scale ⅛ In. to the Foot



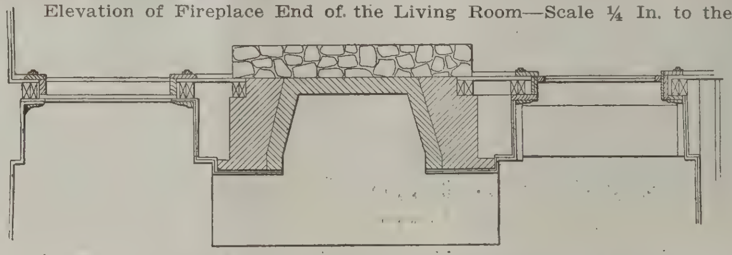
Detail of Column and Girder Construction in the Basement — Scale ⅛ In. to the Foot



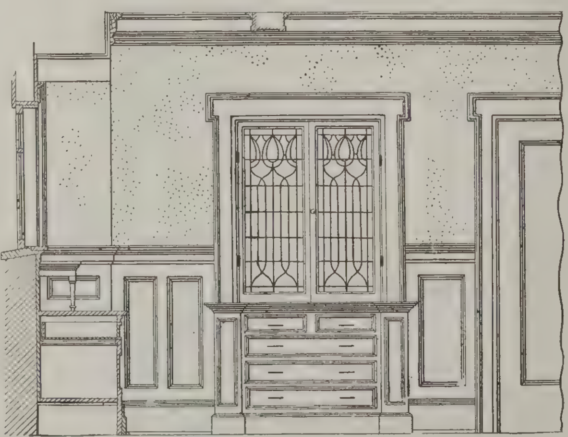
Rear Elevation—Scale 3/32 In. to the Foot



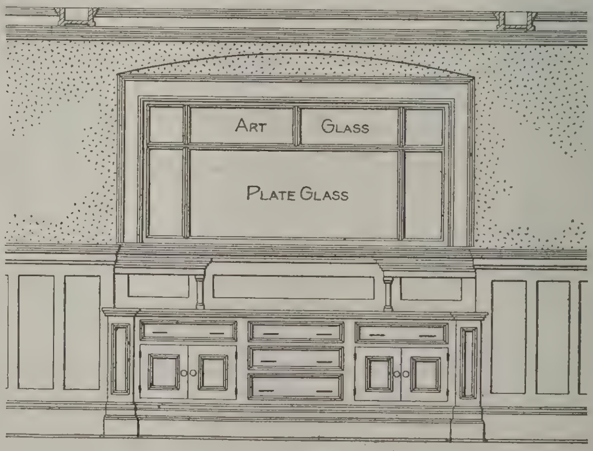
Elevation of Fireplace End of the Living Room—Scale ¼ In. to the Foot



Plan of Fireplace in Living Room—Scale ¼ In. to the Foot



Elevation of China Closet in the Dining Room—Scale ¼ In. to the Foot



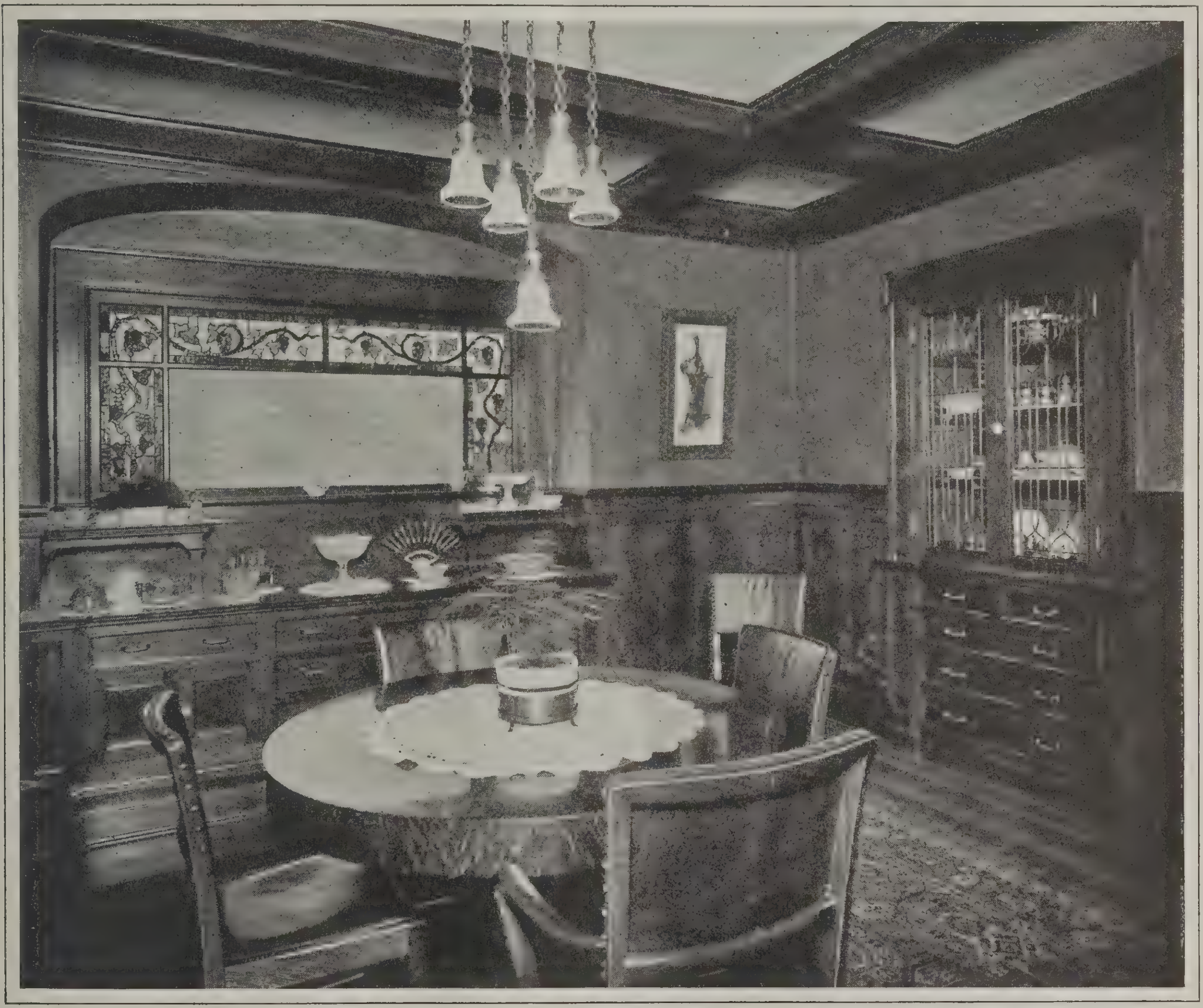
The Built-In Buffet in the Dining Room—Scale ¼ In. to the Foot

A Picturesque Design for the Lakeside—Elevation, Section and Miscellaneus Constructive Details closet for wearing apparel, umbrellas, etc., and well lighted by a window at the front. From the vestibule one enters the hall from which rise combination stairs, the common landing being eight steps up from the kitchen. The stairs to the cellar lead from the passageway between the kitchen and the front hallway. The arrangement is such as to give direct communication between the kitchen and the front door—a feature not always considered by the architect when designing private houses.

The striking feature of the main floor is the spacious living room finished in birch stained fairly dark and which faces the south and the city of Worcester. At the rear end is a large tile fireplace having wood top with mirror and a bookcase at the right. The whole of the face and end returns of the fireplace are done with 6 x 6 in. variegated tile. An excellent idea of the finish and arrangement of this room may be gained from an inspection of the half-tone picture shown on the first page of this article. At the left of the fireplace is the door leading to the rear veranda with its beautiful outlook.

The dining room at the left of the main hall is finished in quartered oak, has beamed ceiling and paneled walls. In the extension in the left wall of the dining room is the built-in buffet or sideboard with its leaded glass and beveled mirror treatment, while at the end toward the pantry is the china closet with sash doors filled with plain glass in metal setting. An excellent idea of the effects here produced may be gained from the picture which represents the dining room interior, while the constructive features are to be found among the details on another page.

Communication between the dining room and kitchen is established through the medium of a commodious pantry well lighted by an outside window and equipped with shelving, closets and butler's sink. The kitchen has opening from it a kettle closet and in the entry space is the refrigerator with door so placed that it may be iced from the outside. Opening from the entry is a space containing the hot water boiler. Immediately in the rear of the dining room is the laundry with its three-part wash trays and servants' toilet.



A Picturesque Design for the Lakeside—View in the Dining Room of the Residence of Mr. Nils Bjork, Showing the Handsome Treatment; Also the Built-in Buffet and the China Closet

On the second floor are three large sleeping rooms, a den, the bathroom, linen closets and a commodious hall in which the stairs from the first story land near the front, thus giving them ample light. In this upper hall is a seat near the head of the stairs and there is also the flight of stairs which leads to the attic. A view in the owner's chamber or master's room, as it is often called, is given in one of the pictures on another page.

The den is finished in Mission style. The hall and owner's sleeping room are in birch finished natural; other sleeping rooms and bathroom are done in birch and finished with gloss white paint.

The bathroom, which is of good size and out of which opens a linen closet, has a tile floor and a wainscoting 4 ft. high of the same material. The bathroom is fitted with modern open fixtures and there is a shower over the bath tub, the fixtures for all of which being furnished by the Colwell Lead Company, New York City. The attic is finished in one large room, the walls being set in about 4 ft. from the outside all around.

The finish floor in the dining room is of quartered oak and those of the halls, living room and chambers are selected light maple, all matched together and laid crosswise of lining floors and blind nailed. The top floor in the rear or service parts of the house consists of a good quality of matched pine flooring and is covered with linoleum.

The exterior doors are 1¾ in. thick, the front one having beveled plate glass the full hight. The interior doors are of the Morgan type, made by the Morgan Sash & Door Company, Chicago, Ill. Those in the front portion of the house have one large flat panel and are 1¾ in. thick, while the remainder of the doors have two flat panels. The doors to one of the closets in the owner's sleeping room has a plate glass mirror the full size.

The house is wired for electric lighting throughout and piped for fuel gas. It is heated by means of a hot water system.

The shingles on the side walls of the house are stained a fairly dark green with cream colored trimmings, while the stucco work of the main story is of a neutral drab with a slightly greenish tint.

The charming dwelling here illustrated and described is owned and occupied by Nils Bjork, of Worcester, Mass., who operates the largest retail and wholesale millinery establishment in that part of the state of Massachusetts.

The drawings were prepared by architects John P. Kingston & Son, 518 Main street, Worcester, Mass., and the work was executed under their immediate supervision.

The galvanized woven wire lathing used in connection with the stucco work was made by the Clinton Wire Cloth Company, Clinton, Mass.

The general contractors were E. Gullberg & Son, the mason contractors were Faucher Bros. and the painting contractors were Wandlund Brothers, all of Worcester, Mass.

The Shape of Theatre Interiors

In commenting upon the shape of theatres or rather of their auditoria, a writer in a recent issue of the London Times calls attention to the fact that when James Burbage built the first public playhouse he made it round, thus following the principle adopted in the Greek and Roman theatre, the Roman amphitheatre, the bull-rings and bear-rings. The writer makes the point that the Elizabethan theatre had its stage out in the arena, with the audience on three sides of it, and the "Restoration" stage had its "apron" projecting so far out into the auditorium that the people in the side boxes must have seen a great deal of the action from behind.

The modern theatre, it is pointed out, has entirely altered the relative position of stage and audience. The stage is no longer among the audience, but a framed picture in front of them, and the writer therefore suggests that the proper shape for a modern theatre auditorium is rectangular, and the retention of side galleries a solecism. Theoretically the principle of the writer is sound, but he forgets that galleries on the side walls enable a larger audience to be grouped within a theatre of a given size, thus with any given audience bringing a larger proportion nearer to the stage, and as theatres are commercial ventures—often, we might say, speculations—making for economy in cost of erection. It may be remembered that in many large concert halls of rectangular form side galleries are used as well as those at the end.

Hight of Kitchen Sinks

A very unfortunate feature often found in connection with the kitchen equipment of our modern apartments is the uncomfortable hight at which the sink is placed. In many cases its position is so low as to cause the person working at it to bend or stoop over in a way to soon make the back ache and prove exceedingly tiresome. Cases might be cited where upon measurement the front rim of the kitchen sink is found to be only 28 in. from the floor, and it can readily be imagined how uncomfortable this must be to a person of average stature.

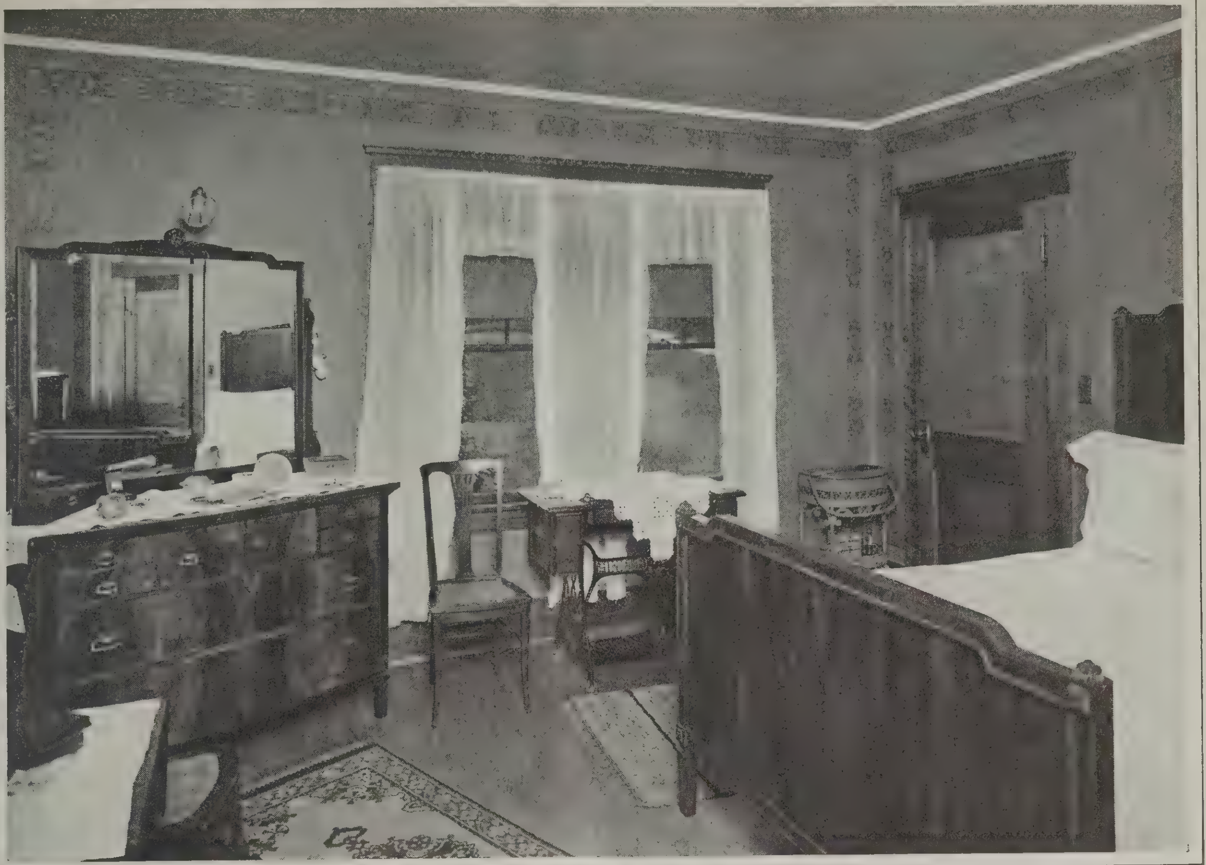
In order to obtain a consensus of opinion as to what is the most desirable hight for a kitchen sink the Trenton Potteries Company, Trenton, N. J., has recently given out the results of a straw vote which was taken for this purpose. When the votes were counted it was found that 8 per cent. were in favor of a hight of 32 in., 59 per cent. favored a hight of 34, and 33 per cent. favored a hight of 36 in. From these figures it will be seen that 28 in. is exceedingly low for a kitchen sink and decidedly uncomfortable for the person who has to do work at it.

Tile Work Decoration

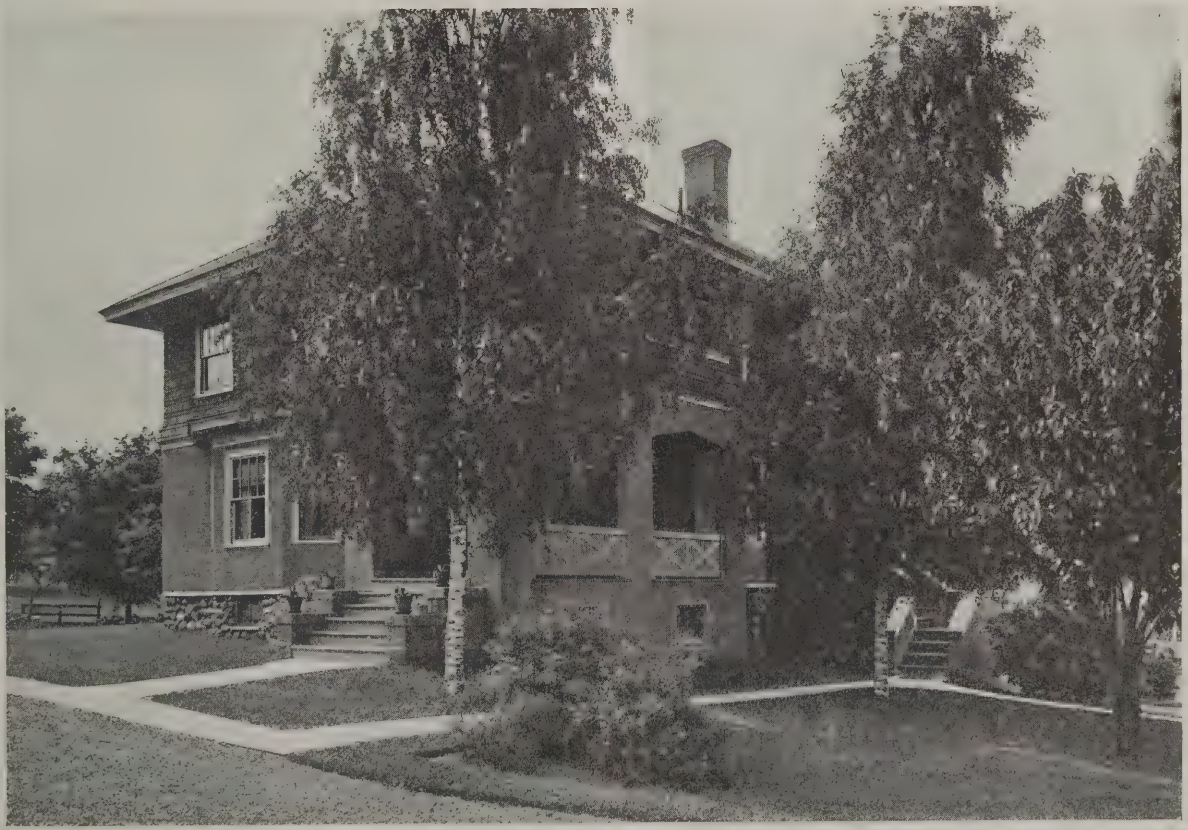
In the course of a very interesting paper on "The Architecture of Portugal," read before the London Architectural Association by W. H. Ward, associate member of the Royal Institute of British Architects, and illustrated by a large number of lantern slides from photographs taken and plans made by the author, the following comments were presented dealing with tile work decoration.

Perhaps the most obvious and enduring effect of Moorish tradition lies in the use of tiled linings. The manufacture of colored glazed tiles in the East is almost as old as history. It was introduced into Spain by the Arabs, perhaps as early as the eighth century, but no existing examples can be proved to be earlier than the thirteenth. Their beauty of color, and the cool expanses of floor and wall surface which they provide, so grateful in the torrid heats of summer, earned them a wide popularity in the Peninsula which they have ever since retained.

In the earliest examples the tiles are self-colored—either bluish-green, brown, dark violet, or milky-white, and of various shapes, and they are laid in geometrical patterns. Later on, a process was invented of producing a pattern on single tiles, by cutting a design in incised lines on a wooden stamp, which was reproduced in raised lines on the soft



The Master's Sleeping Room, Showing Simple But Very Effective Treatment, in Which the Furnishings Play a Most Important Part



A Picturesque Design for the Lakeside—A Rear and Side View of the House Which also Affords an Excellent Idea of the Layout of the Grounds clay; color being then run into the intervening spaces.

The designs were usually of the star type, but grotesque animals and flower and foliage motifs were sometimes introduced; a little later embossed tiles, especially in vine patterns, came into use. At Cintra are several rooms decorated with high dadoes of some of these kinds of tiles, some of them being finished with cusped and crocketed crestings. The tiles used are mostly self-colored, or nearly so; but the old cathedral at Coimbra exhibits fine examples of patterned tiles of the fourteenth century clothing the walls, and, till the recent restoration, also the piers, while a bewildering variety of richly colored devices, producing a tapestry-like effect.

At the Renaissance the star patterns were supplemented by scroll and other flowing ornamentation, and the range of color became more varied, being painted on the tiles without bounding ridges. The patterns are sometimes continuous, covering the whole walls, as in the seventeenth-century sacristy of Sta. Cruz, or enclosed in architectural borders, as at Sao Amaro at Alcantara. About the same time luster tiles—first pale gold and, later, red gold—also came into use.

But after the expulsion of the Moors in 1609 the art of the tile-maker gradually declined, the colors lost in brilliance, and their range became restricted to blue designs on white grounds, with purple and yellow as occasional variants. The blue-and-white technique seems to have arisen simultaneously at Delft and in Portugal, and in each case seems to be the outcome of a desire to imitate Chinese porcelain, then becoming known in Europe. Many of these tiles had a single flower vase or figure subject on each.

The practice, however, of making large figure subjects in ornamental borders, with a portion only of the total design painted on each individual tile, came in during the sixteenth century and continued till the early nineteenth. An example occurs in the nave of Sta. Cruz at Coimbra. Tile linings were applied, not only to rooms, but to cloisters, tanks, steps, garden-seats, and even roofs, but their use for entire house-fronts, now common in Portuguese towns, seems to be no earlier than the nineteenth century; and that is, it came in when both the color and the design of the tiles had sunk to insignificance.

◆

Complex Duties of Architects

In discussing the complex duties of the practice of architecture at the present day a writer in a recent issue of the Engineering Record offers the following pertinent comments.

"Before passing hasty judgment upon the architect of our times, think a moment of the evil days upon which he has fallen. In the Mediæval times he must perforce know only the technique of masonry—the rest was his art. If he were building a church the fine stimulus of the Gothic was his inspiration, and his medium was craftsmanship in stone. To-day he must know masonry and concrete, structural steel, and sanitary plumbing, lighting and heating, electric wiring and acoustics. His predecessor did not have to plan for buying his stone from one source; his steel from another, and his woodwork from a third; he was not hounded by agents of patented devices, nor pestered by circulars of supplies offering him 'the usual architect's commission of —— per cent.'

"All these things the architect of to-day has to endure, besides being called a slavish copyist if he turns to the best in antiquity, and a commonplace innovator if he does not. His chief hope is in suiting himself as best he may to new conditions, calling in technical advisers on the details which he cannot in the nature of things have time to master, even if he has the ability, standing the more firmly by the interests of his client as he confronts a regiment of sub-contractors, and remembering that he must be artist before being engineer or contractor.

◆

Unit Costs on Excavation Job for Building Foundation

One great advantage of the weekly cost sheets made out on various jobs is the fact that unnecessarily high costs in any part of the work are detected and corrected before they have gone far. By thus knowing in detail just what such work costs the contractor is enabled to make correct bids, where less informed contractor would be likely either to take the work at a loss or to figure an excessive charge for it.

As an example of this method of cost keeping and its working out in service by the Aberthaw Construction Co., Boston, an excavation job in New Hampshire may be cited, at which 8022 cu. yd. of material were removed from the side of a hill to make way for a building foundation, and the cost figured out at 37½ cents per cubic yard. This work was done with a 2/3-yd. Thew steam shovel, and showed a saving of probably 2 cents per unit as compared with hand work. At the same time it should be remembered that a great deal of railroad excavation is done at a cost of 5 to 6 cents per cubic yard, and many contractors would have bid 20 or 25 cents on the job in question—and lost money.

An analysis of the figures shows that labor alone (around the shovel, pushing and unloading the dump cars and spreading the material at the dump) accounted for practically 23 cents per cubic yard of total material handled. The items of rental of shovel and track, repairs, etc., were so small that, figuring on these as a basis, a much lower figure than that obtained would have been bid by an inexperienced contractor. This shows in a very clear way the advantage of an exact cost accounting system on jobs of this sort as a guide to future work.

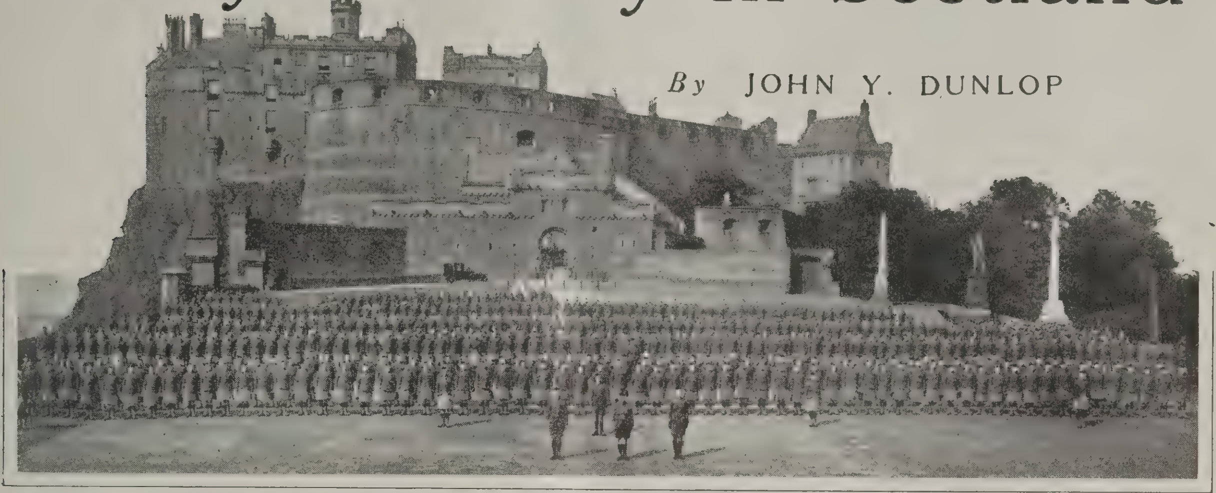
The unit costs are shown in the following table:

	Per cu. yd. Cents.
Labor around shovel, pushing cars, unloading and spreading at dump	22.9
Repairs, $18.58; rental of shovel $345.00	4.5
Labor on track, including 10-ft. high trestle	3.5
Labor for unloading, placing, etc., at the job	3.1
Rental of Track	1.4
Labor at Boston end (including riggers' bill)	1.25
Freight on shovel and parts (both ways)	0.85
Total	37.5

Most of the material was dry gravel with a small percentage of boulders. It was carted off in dump cars pushed by hand back and forth on a standard contractors' track (500 ft.) carried on a trestle about 10 ft. above the ground. The average haul was about 400 ft.; the shortest haul, 200 ft.

Early Masonry In Scotland

By JOHN Y. DUNLOP



PICTURE OF EDINBURGH CASTLE WITH THE CAMERON HIGHLANDERS ON PARADE AUGUST 9, JUST PRIOR TO LEAVING FOR THE CONTINENT TO ENGAGE IN THE BATTLE AT MONS

THE devastating war which is now in progress on this side of the world, involving nearly all of the nations of Europe and bringing into the battlefields of France thousands upon thousands of English troops including the famous Highland Brigade of Scotland, recalls to mind the days in which most of the buildings erected in Scotland were of a fortified design. These castles and semi-fortified houses form a very interesting group, possessing strongly marked characteristics.

They were designed on a mixed style in which the Gothic element predominated and which was the severe and simple architecture of strongohlds built with stubborn material. They were usually erected on rocky sites where there was little inducement to indulge in ornamentation, the idea seemingly being to give to them a rugged and impressive aspect. Any classic features which the buildings possessed were taken from France and in those days the Scotch were intimately allied with the French as happens to be the case to-day from a military standpoint. It is therefore not surprising that the Scotch Baronial architecture should very closely resemble the early Renaissance of French chateaux.

This early style was created entirely in stone, as stone walls and stone roofs were the common factors in its creation as was usually the case in those days.

The hardness of the stone in which the Scotch masons wrought forbid them attempting the extremely delicate details of the French ornament and it led to a boldness in execution which would have appeared exaggerated and extreme in France.

The masons in those days built most of their work in rubble in which large stones or jumpers were used. In this irregular coursed rubble the stones were bedded flat and run to a certain extent in courses which are, however, stopped at irregular intervals just as any deep stone happens to break them. The joints in this case are not necessarily vertical, but in a superior class of work they would now be specified to be vertical and bedded horizontal.

Members of the Highlanders Brigade Returning with Rations for the Mid-Day Meal While Awaiting Marching Orders for the Front

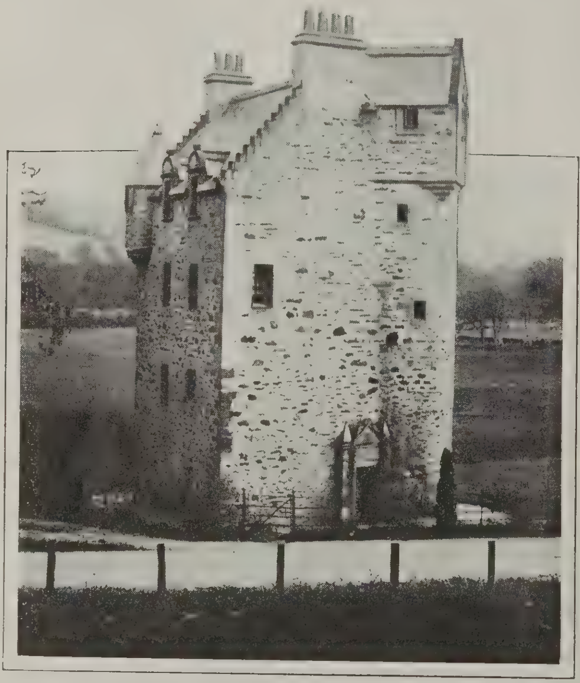
In the examples which are shown in the halftone illustrations accompanying these comments the stones are all roughly squared and are axe-faced. This class of walling is very bold and effective, especially for military purposes. Necessarily the walls are very thick and are built up with a fair face on both sides, the center of the wall being grouted with hot semi-liquid mortar.

One quarter part of the face of each course consists of bond stone. Each header is the entire width of the course and of a fair depth. The headers are roughly squared with the hammer and the beds are hammer dressed to an approximate plane. Headers of successive courses are not placed over each other, the idea being to avoid a deficiency of bond in the intermediate parts of the course. Between the headers each course is built up of smaller stones, of which there may be more than one in the depth. These are all roughly squared so as to have vertical side joints.

Apart from the type of wallings, the most characteristic features of those buildings are shown in the half-tone illustrations. In about all of them are to be found the short round angle turret which in the later examples are capped with pointed roofs. The corbels which carry them are always of a bold, vigorous character and frequently are enriched with a kind of cable ornament which is very distinctive.

Towers of circular plan like bastions and projecting at the angles of the main building constantly occur.

Parapets are in general use and are battlemented. The roofs, when visible, are of steep pitch and are frequently covered with stone, as shown at the right in the picture of Edinburgh Castle, which forms the basis of the picture on the first page of this article. The windows as a rule were small and square headed.



Early Masonry in Scotland—A Semi-Fortified House in Scotland Erected in the 16th Century

There are many other picturesque features to be seen in a visit to these mediæval buildings and interest in them is just now linked up with the conflict which is raging upon the continent.

In the half-tone picture on the first page of this article and which illustrates the parade ground is shown the Regiment of Cameron Highlanders who, the day following the picture was taken, left for Belgium and formed part of the British army which suffered so severely at Mons.

This regiment has good reason to know something about the history of the district as they have been stationed for some time in Edinburgh Castle, in which among the national treasures of Scotland is to be found the famous gun Mons Meg, which, according to the inscription on the carriage, was constructed at Mons in 1486.

Mons Meg is made of thick iron bars held together by massive metal rings, its length being 12 ft. and its bore having a diameter of 20 in. It burst in 1682 when being used to fire a salute in honor of James, Duke of York, and in 1758 it was sent to the Tower of London. In 1829 it was restored to Edinburgh and its return was welcomed by the citizens by great demonstration and joy.

Truly in all things the changes and progress made during the last few centuries have been very great, but it is just a pity for the welfare of our country that progress does not always maintain peace with its people.

The War vs. Competition for Business

The following editorial comments in the September Bi-Monthly Magazine of the Builders' and Traders' Exchange of Detroit contain much food for thought on the part of practical builders:

"The existing war in European countries, while very interesting to the reading public, is a disgusting affair when viewed from a standpoint of civilization at the present day and age. And yet it is only on a larger scale, the same sort of warfare in a way that is being practiced almost daily in our own country and in this very city, in some lines of business, when modern methods and conditions, should have abolished this warfare long ago.

"Competitors are fighting one another, in many instances, in just such a disgusting way and cutting each others throats, so to speak, in an endeavor to secure more business and put the 'other fellow' out of 'the running' if possible. And the little fellow, in this struggle, is trampled under foot, just as the little nations across the water are, without regard to right, strength, or reason, by the combatants, whether victor or vanquished in the end. And why all this warfare and strife; this sacrificing of human life and decent business? Is it necessary or justified? Do the winners gain, or do they lose even if they win?

"The real reason it seems to us, harks back to that old enemy—inherent selfishness. A desire to gain all for ourselves, without regard to the rights or needs of others, influenced in actions from motives of private advantage.

"And what does it profit? We live only so long anyway. We can take nothing away with us and we can use only so much while we are here. Is it not worth more, to be square, decent, peaceful and upright than to have all the business, all the money or all the territory in the world? We do not wish to preach, but we cannot help alluding to that question in the Good Book, which asks 'What shall it profit a man if he gain the whole world and lose his own soul?' Is it not worth considering, and can we not gain more in the end by being a whole lot less selfish, a whole lot less 'scrappy,' a whole lot more honest and decent and have as our motto 'Live and help live?' Think it over and let's see if we can't adjust our own individual deeds and actions to assist in a widespread movement of the adopted motto of this Builders Exchange on the front cover of this magazine.

"It's what we stand for; let's live up to it!"

A Modern Two-Room Schoolhouse

A Superstructure of Cement Brick on a Foundation of Concrete Blocks—Asbestos Shingles Cover the Roof

AN interesting example of a small fireproof schoolhouse erected in accordance with the Building Code of the State of Ohio is illustrated herewith. It is a two-room building, having foundation walls from grade to water table consisting of four courses of 8 x 8 x 20-in. rock-faced hollow blocks made of a 1:3:5 mixture using ¼ to 1-in. crushed stone, the facing being of a 1:2 mixture, ¾ in. thick, of light-colored cement and white sand. The blocks are set in cement mortar tempered with one part lime putty to nine parts cement.

As regards the exterior walls, the code of the State of Ohio requires 13-in. fire walls up to a point within 10 ft. of the top of the walls in a case like the present, and then 9 in. for the remaining distance. The superstructure is of cement brick, which are faced with two parts of white sand to one part of "Medusa" cement, the mixture having incorporated in it a small amount of mica screenings.

The roof is covered with ⅞ x 5¼-in. sheathing boards laid close together. On these was placed one thickness of asphalt roofing felt laid with 2½-in. lap and weighing not less than 30 lb. to the square. The entire surface was then covered with asbestos shingles furnished by the Keasbey & Mattison Company, Ambler, Pa.

The trusses, girders, posts, purlins, rafters, floor joists and studs are of yellow pine. The first floor joists are 2 x 12 in., placed 18 in. on centers; the class-room ceiling joists are 2 x 6 in., placed 10 in. on centers, and studs are 2 x 4 in., the tower deck joists 2 x 10 in. and the tower ceiling joists 2 x 12 in., all placed 16 in. on centers. The rafters are 2 x 6 in., placed 20 in. on centers. The lintels are 4 x 4-in. solid pieces with ends resting 4 in. on the walls.

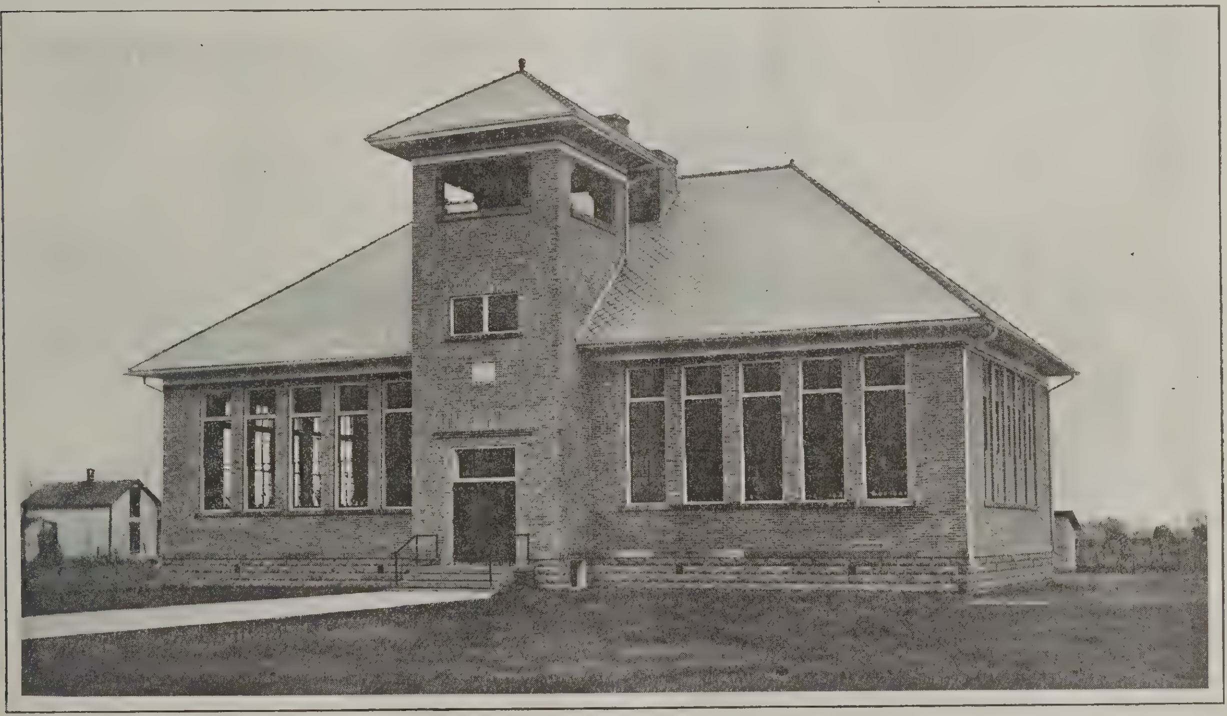
The truss chords are of the built-up type, while the balance of the members consist of solid pieces. The construction, as regards sizes of members, bolts, rods, etc., is clearly indicated in the detail on another page.

The top plate on all outside walls has ½ x 2-in. iron anchor rods, placed 4 ft. on centers, with ¼ x 2 x 4-in. plate at the ends in the walls and heavy washers and nuts on the top ends.

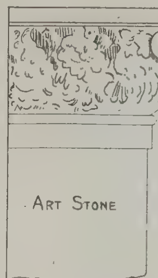
The trim of the building is of artificial stone cast in wood molds and of a light gray color. On the bell tower there is a little carved work, a detail of which is shown on another page. This work was cast plain and then hand carved, giving it the appearance of natural stone.

According to the plans each class room is 31 x 38 ft. in size, and out of each opens a commodious cloak room. The position of the teacher's platform in each room is clearly indicated, also the location of the several radiators which form a part of the heating system. Some details of the latter are indicated on the basement plan.

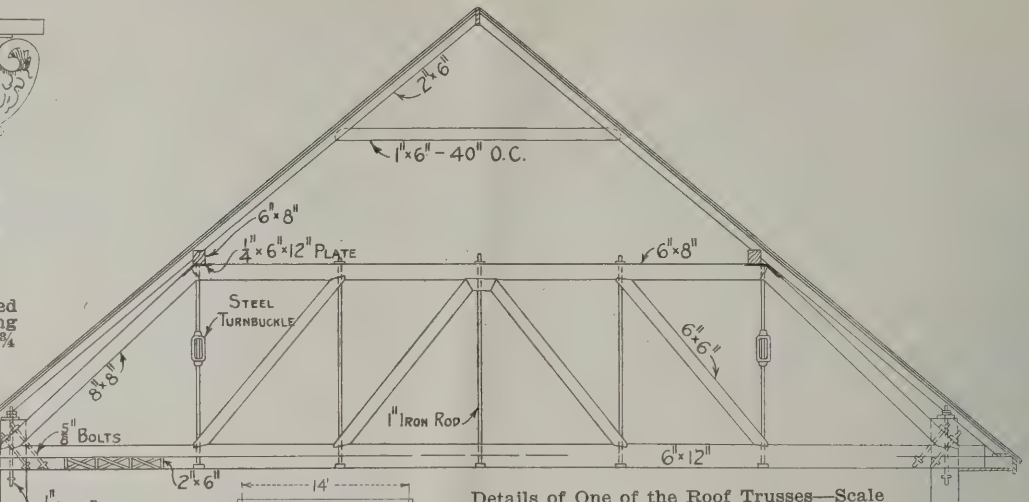
The floors in the class rooms are double, the subfloor consisting of ⅞-in. boards laid diagonally,



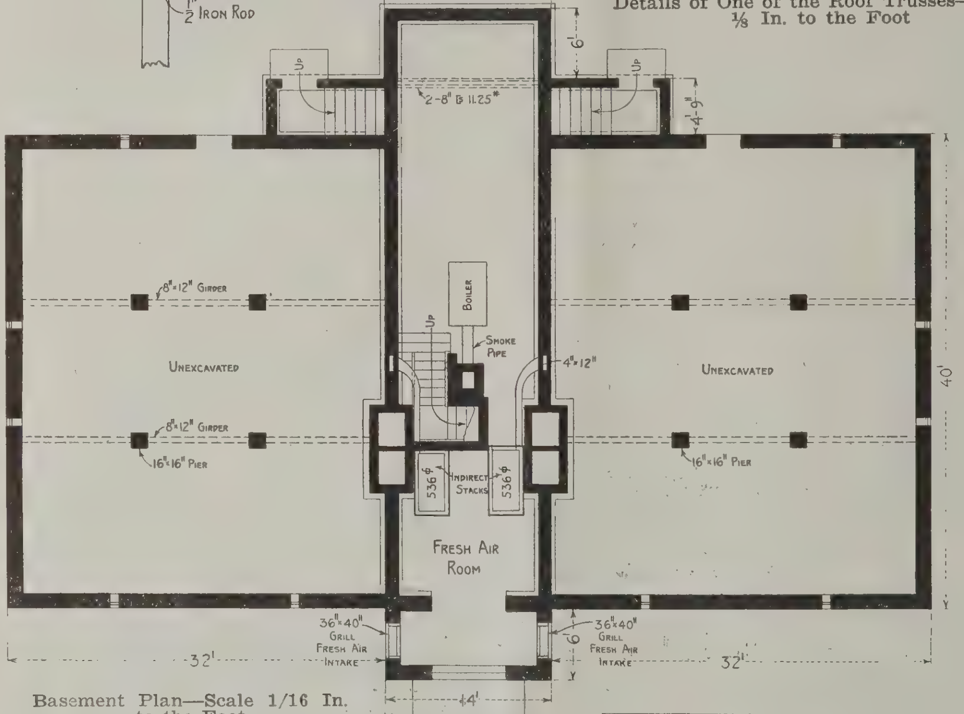
A Modern Two-Room School House at Osgood, Ohio—Architect, C. F. Bowdle, Piqua, Ohio



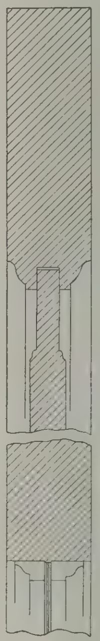
Detail of Carved Capitol at Opening in Tower—Scale ¾ In. to the Foot



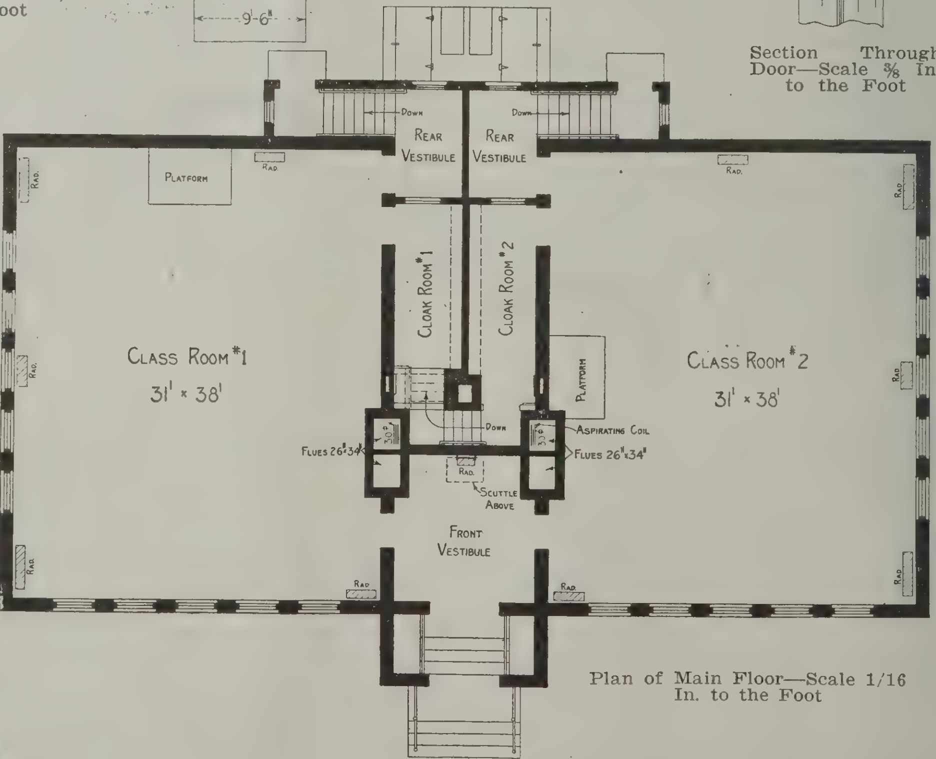
Details of One of the Roof Trusses—Scale ⅛ In. to the Foot



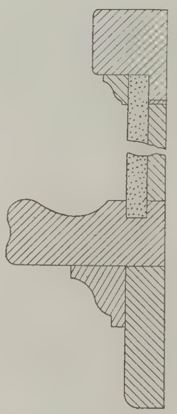
Basement Plan—Scale 1/16 In. to the Foot



Section Through Door—Scale ⅜ In. to the Foot



Plan of Main Floor—Scale 1/16 In. to the Foot



Section Through Blackboard and Trim—Scale ¾ In. to the Foot

A Modern Two-Room School House—Plans and Miscellaneous Constructive Details while the finish floor is of 13/16 x 2¼-in. face yellow pine.

The doors are of white pine with raised panels ¾ in. thick. Walls and ceilings except where blackboards are placed are covered with two coats of United States Gypsum Company's adamant plaster, which was given a sand finish composed of white sand and lime putty.

A Modern Two-Room School House—View in Class Room No. 1, Showing Doors to Rear Vestibule and Cloak Rooms, also Ventilating Registers in the Wall

All double exit doors are fitted with Prince automatic Cremore bolt with panic release feature furnished by the Vonnegut Hardware Company. All hinged doors on the main floor have bronze faced, mortise, cast bronze escutcheons and knob latches, no keys being required. The doors are hung on bronze ball bearing loose pin hinges, three to each door.

The window sash are hung on heavy braided sash cord running over steel pulleys and carrying iron weights. The hardware throughout conforms to the Ohio State Building Code and is so applied that all doors and windows operate as the code requires.

The blackboards, of ⅜-in. slate, are 3 ft. 6 in. high, and were furnished by the Pennsylvania Structural Slate Company, Easton, Pa.

In the vestibule ceiling there is a 30 x 30-in. opening shown on the plan which gives access to the bell tower above through the medium of a ladder provided for the purpose.

At the bottom of the basement stairway is a self-closing standard fire door having weights and cord and fusible links.

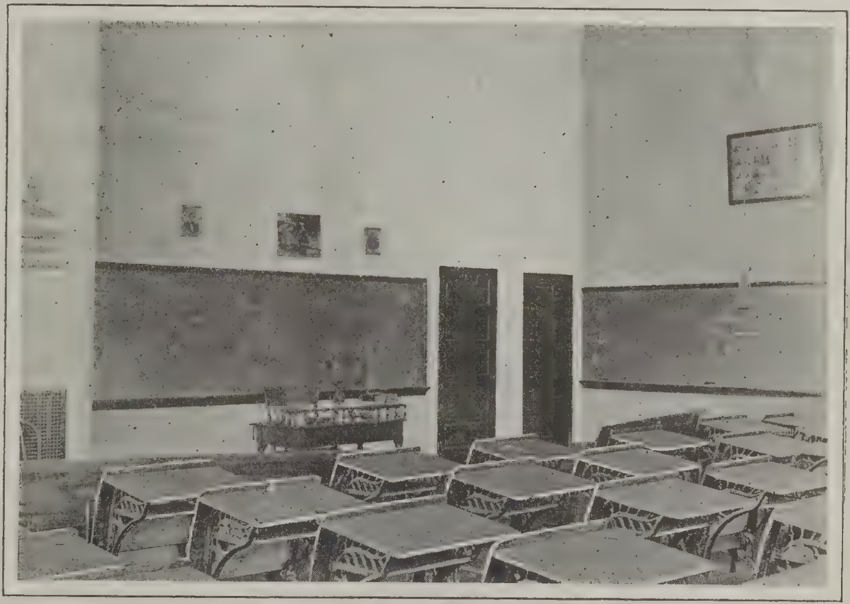
By reason of the location of the schoolhouse no drainage was obtainable, and it was necessary to place the boiler room in the basement and render it waterproof. The latter was accomplished by the integral method of Trus-con waterproofing paste mixed with the water with which the concrete was prepared.

The floor consists of 6 in. of concrete of the same mixture as was used for the floors of the fresh air and heater rooms, as well as for the furnace pit.

With the exception of that which is waterproofed the concrete was composed of one part Portland cement, three parts sand and five parts gravel. The waterproofed portion was composed of one part Portland cement, two parts washed sand and four parts crushed stone, 60 per cent. being 1 in. to 1½ in. and 40 per cent. being ¼ to 1 in.

The combined fireproof ceiling over the boiler, the heater and fresh air rooms running from front to rear of the building was constructed as follows:

In the first place 8-in. steel I-beams were set 4 ft. on centers, then between them was sprung No. 26 gauge corrugated iron, giving 4 in. rise. This was given a coat of Graphite paint on both sides before selling, and the I-beams were treated with Graphite paint. All exposed surfaces of corrugated iron and the steel beams were given one coat of Graphite paint after the work was in place and dry. On this was placed expanded metal lath to carry the cement which was run 3 in. above the tops of the I-beams. Floors on this construction include the front entry, vestibule, cloak rooms and all first floor rooms over the fireproofed portion of the building.



View in Class Room No. 2, Looking Toward the Platform and Teacher's Desk

The schoolhouse is provided with a low pressure gravity return steam heating apparatus. An American Radiator Company's "Ideal" steel boiler was installed, having a rated capacity of 2625 sq. ft. of direct radiation. The indirect radiator stacks are placed directly at the base of the fresh air flues, as shown on the plan. Three separate feed and return lines run to and from the radiators with 2½-in. main to catch radiators in class room No. 1 and then over to a point under the class room opposite the boiler, then through the wall and return to the boiler. A similar main and return is provided for class room No. 2. A 3½-in. main is run to catch two indirect stacks with 2-in. return to the boiler.

Each foul-air flue has 30 sq. ft. of radiation for the aspiring coils, and each of the two indirect radiator stacks contains 536 sq. ft. of cast-iron radiation. Each class room has 360 sq. ft. of direct radiation, while the vestibule has 30 sq. ft.

The fresh-air flues are provided with black japanned register faces without valves, and the foul-air flues have similar registers, but with valves. All fresh and foul-air flues are plastered inside.

The heating and ventilating apparatus is installed in accordance with the Ohio State Building Code, and is designed to heat the rooms to a temperature of 70 degrees in zero weather and change the air in the rooms six times every hour.

The schoolhouse here shown was recently erected in Osgood, Ohio, in accordance with plans prepared by Architect C. F. Bowdle, Room 72, Young Block, Piqua, Ohio, at a contract price, exclusive of heating, of $7,004.27. The heating and ventilating contract amounted to $1,086.47.

The cement brick was furnished by the Cement Tile & Block Mfg. Company, Osgood, Ohio, and the contractors for the schoolhouse were Alexander & Bowers, of Osgood, Ohio.

◆

"Ideal Homes" Built by Women

There are three women members of the University of Missouri faculty who have recently constructed for themselves "ideal homes," the members being Miss Louise Stanley, assistant professor of home economics; Miss Florence Whittier, assistant librarian, and Miss Eva Johnston, associate professor of Latin. A St. Louis writer furnishes the following interesting particulars:

In each case the woman owner designed the house and looked after the building. The three homes vary decidedly in architectural design, but, if they may be taken as typical of woman's ideas in general, they prove that a woman-made house normally includes these things: Individuality, comfort to a high degree, privacy, abundance of closets and shelving space, labor-saving and step-saving devices, safeguards against the accumulation of dust, built-in conveniences.

In Miss Stanley's home, particularly, every effort has been made to save steps. The wall between the kitchen and the dining-room is made up partly of a buffet and a china closet. Each of these opens both into the dining-room and into the kitchen. This arrangement and the smallness of the kitchen are designed to save walking about in the preparation and serving of meals. Just inside the door from the dining-room is a big shelf and adjoining it the kitchen sink for the dishes as they come from the dining-room. There the dishes may be washed and dried and put into the buffet or china closet, all without requiring a step.

Everything needed for the preparation of a meal is found in this 7 x 4 kitchen. At the end of the built-in cupboard is a shelf on which sits a legless gas stove. Under the shelf is an inclosed space for a garbage bucket. An opening in the shelf allows the barbage to be dropped through, and the garbage man takes the bucket away through the hole made in the side of the house. To the right of the shelf is a built-in closet for provisions. The arrangement of kitchen is similar in all three houses.

Individuality of taste is seen in the arrangement of the living-rooms and bedrooms of the owners. Electric lights are not placed primarily for ornamentation, but are provided where they are most needed for sewing, reading or dressing.

An upstairs living-room in Miss Stanley's house has a fireplace and built-in bookcases. Adjoining is the owner's bedroom with built-in furniture, and opening from that is a sleeping porch.

In each of the three houses there is an abundance of closets, made dustproof, or as nearly so as possible. The bathrooms are built with unusually large closets and with mirrors arranged so that they may be conveniently used as dressing-rooms. There are closets, too, for brooms and other cleaning apparatus. The guest room in Miss Whittier's house has a closet large enough to accommodate a trunk and suit cases.

None of the three houses has a front porch and none has a back porch of the ordinary type. The back or side porches are really living-rooms, with much window space. The utmost privacy is insured in Miss Johnson's house through the fact that the living porch has no outside entrance. To reach it one must go through the living-room or study.

◆

Another New Commercial Building

Another fine structure is about to be added to those erected in the zone of the new terminal of the New York Central Railroad in New York City. The plans which have just been filed by Warren & Wetmore, architects, call for a building to cover a plot 200.8 x 275 ft. and estimated to involve an expenditure of half a million dollars. The plans as filed call for a four-story building which, if necessity demands, may be carried to a height of 13 stories. The facade will be of granite limestone and brick and will conform with the architectural design of the other buildings in the zone. The new structure will occupy the block bounded by Lexington avenue, Forty-fifth and Forty-sixth streets and Depew place.

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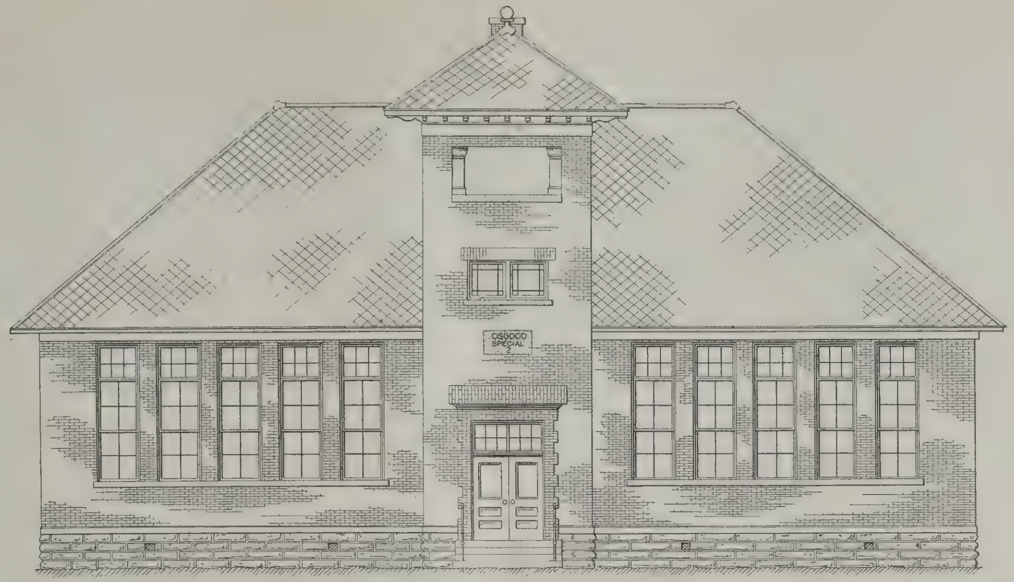
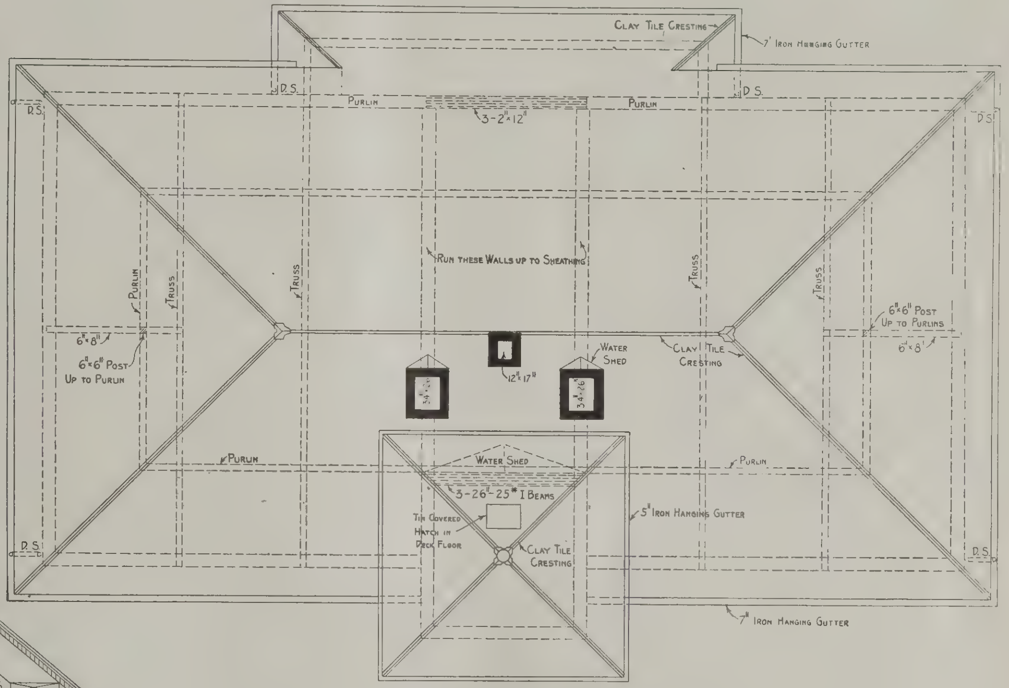
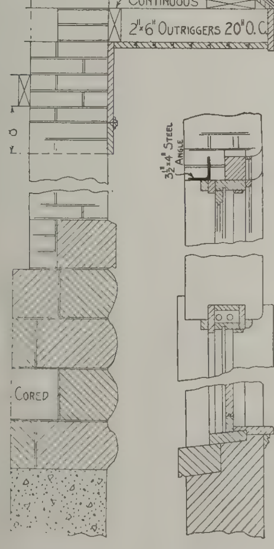
The tendency to increase the hights of business buildings now being manifested in Manila, Philippine Islands, has opened up a new market in that city for elevator machinery. At present there are not more than five buildings in the city equipped with modern elevators but each new structure above two stories in hight calls in its plans for the installation of a modern elevator.



Front Elevation—Scale 1/16 In. to the Foot



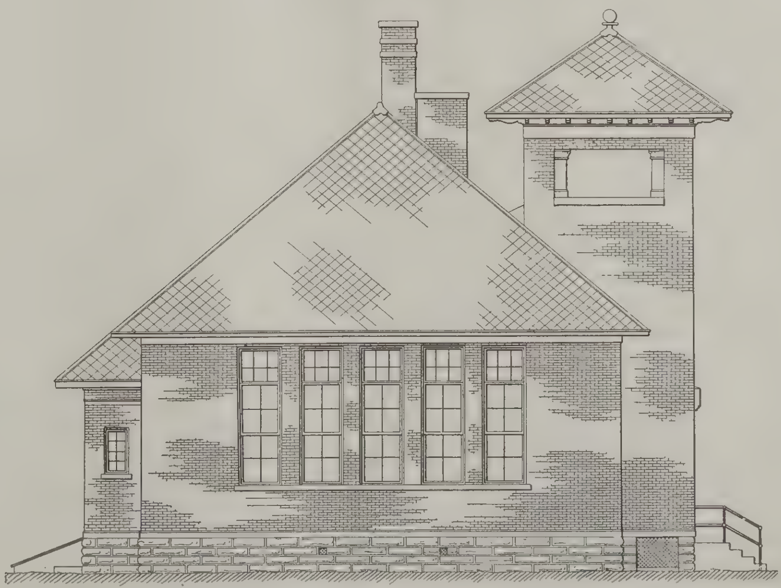
Roof Plan Showing Position of Purlins and Trusses—Scale 1/16 In. to the Foot



Section Through Main Cornice

Section Through Window Frames

Scale ½ In. to the Foot



Side (Left) Elevation—Scale 1/16 In. to the Foot

A Modern Two-Room School House—Elevations, Roof Plan and Miscellaneous Details

A Colonial House for the Suburbs

An Interesting Façade of Symmetrical Treatment — The Living Room a Feature—Some Figures of Cost

WE have taken for the subject of our colored supplemental plate this month a frame dwelling of colonial *motif* and embodying features which well adapt it for erection upon a suburban site. The outside chimney of tapestry brick in the right gable, the long sweeping roofs of the dormers and of the main structure, the eyebrow window nestling among the shingles near the ridge, the impressive porch extending across the front, together with the general color scheme are features which immediately attract the eye and invite the serious study of the observing builder.

Brief Specifications

According to the specifications of the architect the cellar walls are of concrete 12 in. thick resting upon footings 10 in. thick and projecting 6 in. on both sides of the walls.

The girders are of 6 x 8-in. spruce, the sills are 4 x 6 in., laid flat; the first and second floor beams are of 3 x 10 in. long-leaf southern pine placed 16 in. on centers, the rafters are 2 x 8 in. placed 20 in. on centers, and the ridges are of 1¼ x 10-in. material. The headers and trimmers are double and hung in stirrup irons. The outside vertical walls are covered with ⅞ x 8-in. matched sheathing boards dressed on one side, over which is placed one thickness of black Neponset building paper. This in turn is covered with clapboards fastened in place with heavy galvanized iron nails. The roof is covered with shingles laid in regular courses and exposed 5⅛ in. to the weather.

The main cornice is formed with plain facia and simple cornice moldings and soffit.

The floors are of ⅞ x 2½-in. tongued and grooved first quality maple and are blind nailed.

All interior trim with the exception of that in the kitchen, pantries, etc., is of thoroughly seasoned and kiln-dried basswood.

The Plaster Work

The walls and ceilings of the various rooms are lathed and plastered with three coat scratch and brown coat work, making a hard fine-grained surface. The kitchen, pantry, bath, lavatory, etc., have a hard white finish.

The bath room has a hexagonal white tile floor laid on a cement bed with tile base and cove. It has a wainscoting 5 ft. high, made of Keene's cement. All fixtures are porcelain enameled iron with nickel plated fittings.

The hardware is of colonial design, having a neat plain finish. The mantel in the living room is of tapestry brick and is fitted with a large heavy wooden shelf with brackets.

All outside wood and metal surfaces except the shingles have three coats of paint, and the same number of coats was given to all standing woodwork on the first, second and third floors with the exception of kitchen, pantry and closets. The shingles on the roof are treated with Cabot's creosote shingle stain.

The house is piped for gas and wired for electricity, the fixtures being of the combination type. The dining and living room fixtures are drop pendants—a five-light drop for the living room and a four-light drop for the dining room. The bedrooms have wall brackets.

The approximate cubic contents of the house are as follows:

House, porches, etc.	23 x 41 ft. deep x 21 ft.	19,803 cu. ft.
Extension	5 x 8 x 9 ft. h.	360 cu. ft.
Cellar	23 C 32 x 7 ft. h.	5,152 cu. ft.
Total		25,315 cu. ft.

Figuring this at a unit price of 16½ cents gives an approximate cost of $4,176.98.

Estimate of Cost of Labor and Materials

The estimate of cost of labor and materials is found in the following classification:

Excavating	$120.00
Grading	40.00
Masonry, concrete and cement	668.00
Plastering	385.08
Carpentry and mill work	1,030.90
Painting	304.00
Plumbing	340.00
Heating	420.00
Metal work	187.00
Tile and slate	126.00
Mantels	60.00
Gas and electric work	420.00
Hardware	76.00
Total cost	$4,176.98

The country house here illustrated and described was designed by Architect Frank T. Fellner, care of *The Building Age*, 239 West 39th Street, New York City, or 413 Caton Avenue, Brooklyn, N. Y.

◆

The Architect in France

It is unusual for a house, however small, to be erected in France without the service of an architect, who not only draws the plans, but actually superintends the work, says an exchange. Usually it is he who orders the building material and assures himself that its quality is up to requirements.

The contractor and his workmen perform their duties in conformity with the architect's orders, and the latter, who is usually a man of capital, advances the funds required in order that the contractor need not wait for payment until the building is completed.

Moreover, the French law imposes on the architect a serious responsibility, since he, as well as the contractor, is responsible for all defects of construction during a period of ten years.

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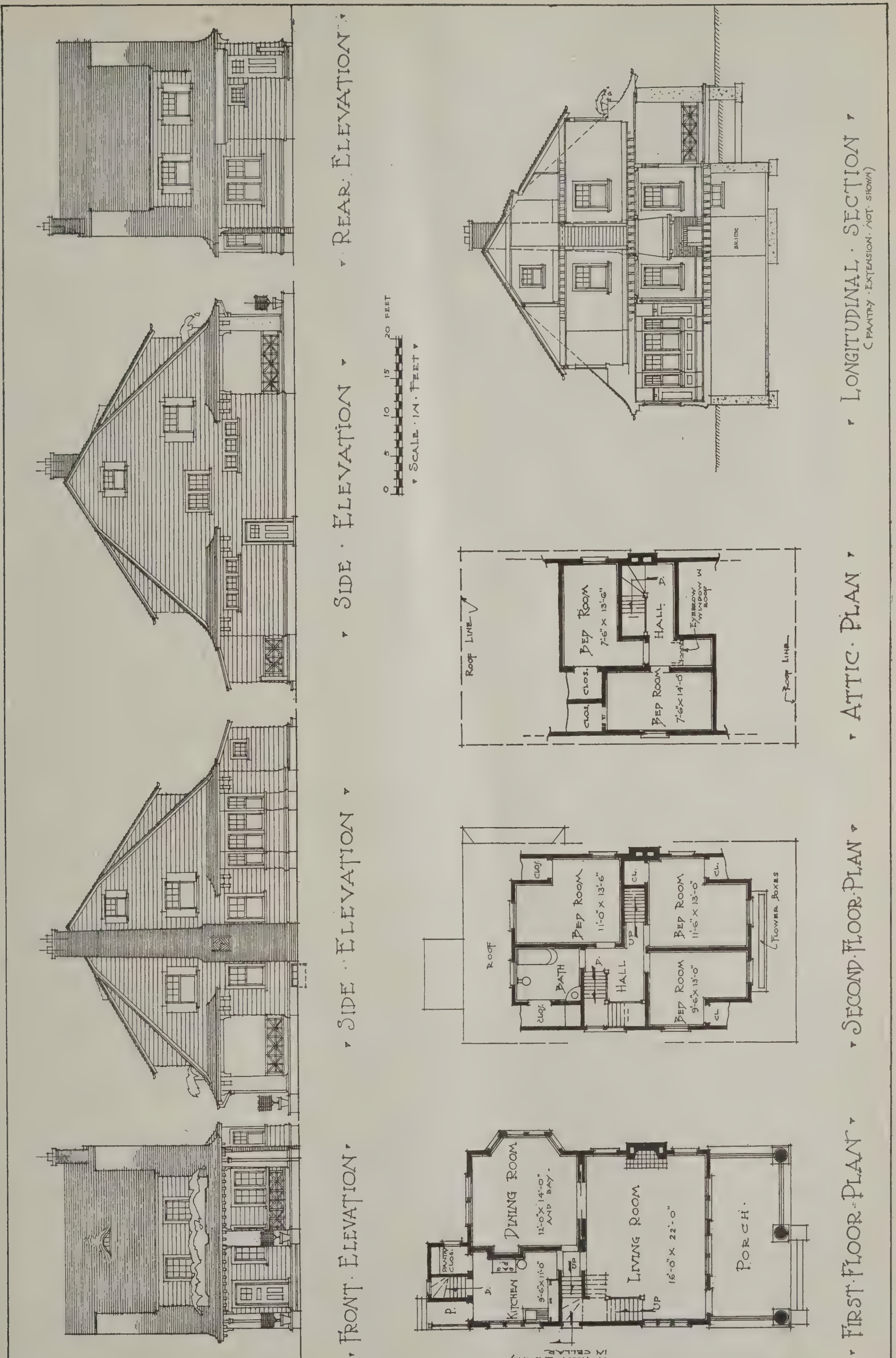
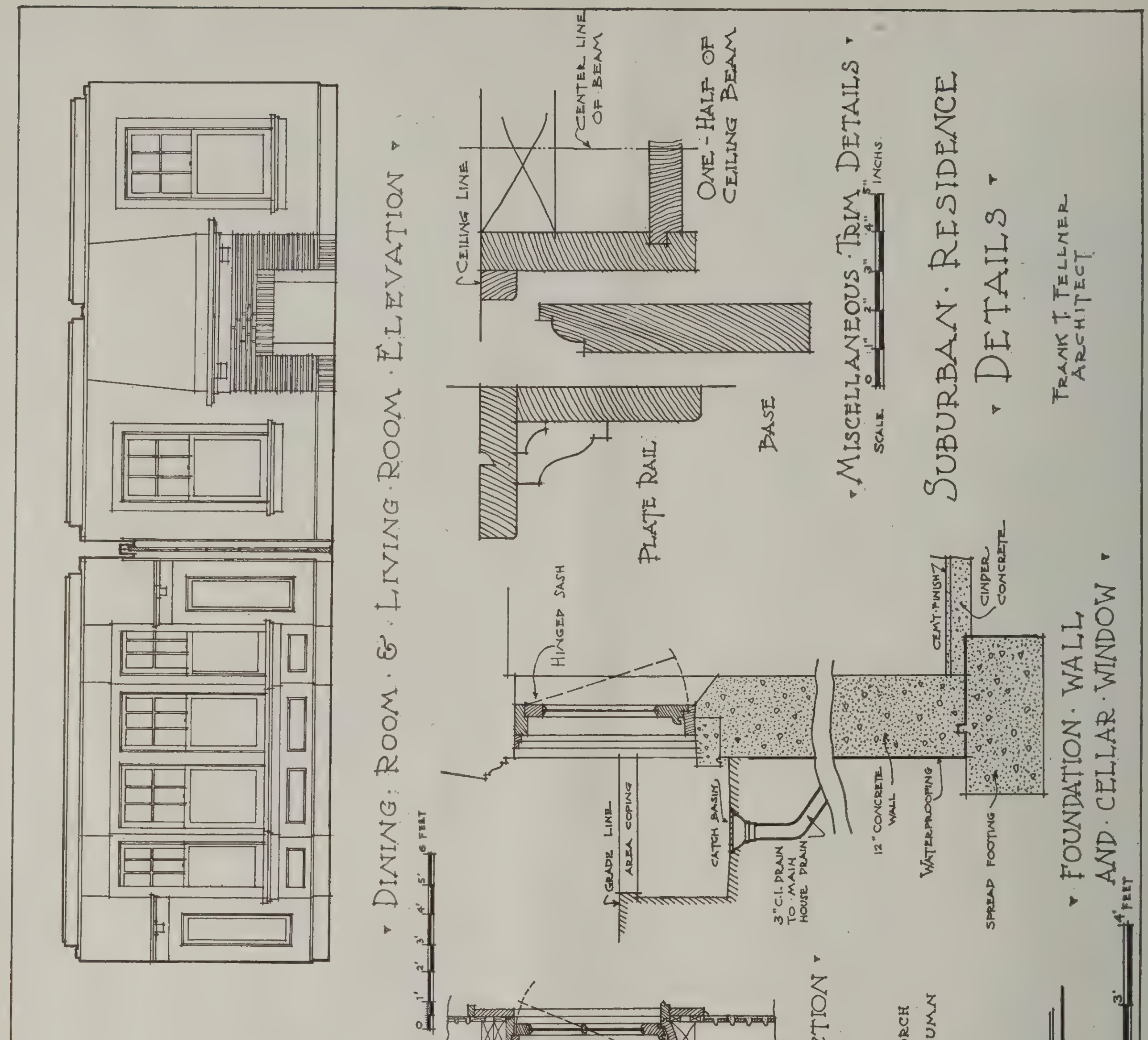


Elevations and Plans of Colonial House Forming Basis of Our Colored Supplemental Plate



Miscellaneous Constructive Details Relating to Our Colored Supplemental Plate

Design of Beams, Girders and Trusses

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C. E.[*]

THE loads are shown in amount and position in Fig. 13. What is the bending moment at the section x — — x,?

The section x — — x, is 2 ft. from the face of the left support. The span face to face of supports = 15 ft., but the length center to center of bearings = 16 ft., assuming a bearing 1 ft. long on each support. Therefore the moment arm from the section to the reaction at the right end = 13.5 ft. The moment arms to the loads from the section are marked on the figure. There is one moment arm, however, of 6.5 ft. to be explained. It is the length from the section to the center of gravity of that portion of the beam lying between the section and the support at the right end. The total clear span = 15 ft. and the section is 2 ft. from the left support. The length of the beam therefore to the right support = 13 ft. and one-half = 6.5 ft. The weight = 13 × 50 = 650 lbs.

$$M = (13.5 \times 738.33) - [(2 \times 200) + (5 \times 300) + (6.5 \times 650) + (9 \times 250)] = 1592 \text{ ft.-lbs.}$$

In Fig. 14 the section x — — x, is taken 5 ft. from the left support. This leaves the load of 200 lbs. to the left of the section so it is omitted from the calculations. The load was used in obtaining the reactions but in this present example it will be noticed that the moment arm from the section is only 10.5 ft. to the reaction. The beam length = 15 — 5 = 10 ft. and the weight = 10 × 50 = 500 lbs., with a moment arm to the center of gravity = 5 ft.

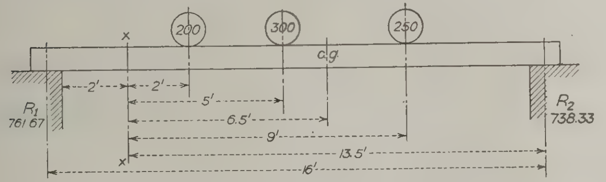


Fig. 13—Example of Uniform Load and Several Concentrated Loads on Beam on Two Supports

$$M = (10.5 \times 738.33) - [(2 \times 300) + (5 \times 500) + (6 \times 250)] = 3152 \text{ ft.-lbs.}$$

In Fig. 15 the section x — — x, is taken 8 ft. from the left support. The beam length = 15 — 8 = 7 ft. and the weight = 7 × 50 = 350 lbs., with a moment arm of 3.75 ft. to the center of gravity.

$$M = (7.5 \times 738.33) - [(3 \times 250) + (3.75 \times 350)] = 3475 \text{ ft.-lbs.}$$

The method given for obtaining the bending moment at any section is used for any number of loads, three loads being used in the examples for the sake of clearness.

Rule for Obtaining the Bending Moment at any Section of a Beam.

Multiply one end reaction by the distance between it and the section. From the moment thus obtained subtract the sum of the moments of the loads lying between the section and the chosen reaction, using as moment arms the length in each case from the center of gravity of the load to the section. The portion of the beam included between the section and the reaction is to be counted as a load.

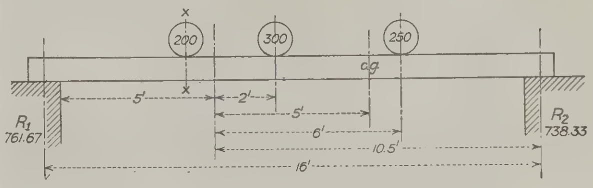


Fig. 14—Another Example of Uniform Load and Several Concentrated Loads on Beam on Two Supports

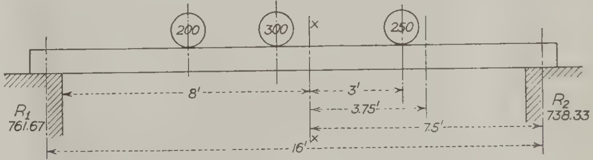


Fig. 15—Still Another Example of Uniform Load and Ceveral Concentrated Loads on Beam on Two Supports

A floor is merely a shallow beam. If it is a solid slab the width is usually 12 inches. If it is carried on joists the width is the distance center to center of joists.

A beam is a secondary girder and the load is usually uniformly distributed.

A girder is uniformly loaded when it carries the floor slab directly without the floor load going first to beams. When the floor rests on beams the reactions at the ends of the beams are concentrated loads going to the girders.

A girder is generally carried on walls or columns and beams are generally carried on girders. A rafter is a girder and purlins are beams, or joists.

For a load concentrated at any point, referring to Fig. 16, $M = \frac{Pab}{L}$, for load only.

Note—In this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

[*] Continued from page 30 of the September issue.

The derivation of the formula is as follows:

$$R_2 = \frac{Pa}{L} \text{ and } R_1 = P - R_2$$

$$\text{Then } M = R_2 b, \text{ which } = \frac{Pab}{L}$$

The maximum bending moment for the load only is under the load. If the weight of the beam is included the moment under the load is,

$$M = R_2 b - \frac{wb^2}{2}$$

in which w = weight of beam per lineal foot.

Example.—A beam with a length of 15 ft. between centers of supports carries a load of 600 lbs. at a point 5 ft. from the left support. The weight of the beam per lineal foot is 9 lb. What is the bending moment?

1st—For load only.

$$M = \frac{Pab}{L} = \frac{600 \times 5 \times 10}{15} = 2000 \text{ ft.lb.}$$

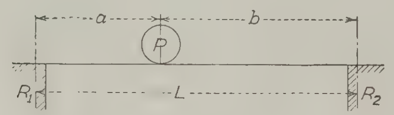


Fig. 16—Concentrated Load at Any Point on Beam on Two Supports as Shown

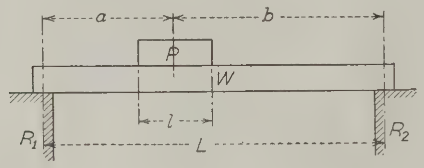


Fig. 17—Partially Distributed Load on a Beam Resting on Two Supports as Shown

Design of Beams, Girders and Trusses

2nd—For load and beam.

$$R_2 = \frac{Pa}{L} + \frac{wL}{2} = \frac{600 \times 5}{15} + \frac{135}{2} = 267.5 \text{ lb.}$$

$$M = R_2 b - \frac{wb^2}{2} = (267.5 \times 10) - \left(\frac{9 \times 10^2}{2} \right)$$

$$= 2675 - 450 = 2225 \text{ ft.-lbs.}$$

Referring to Fig. 17. The load P acts through the center of gravity but the effect is lessened because the load is distributed over a portion of the beam instead of acting at a point as it would were the load round like a ball.

Consider the load of 600 lbs. in the last example to be distributed over a length of 3 ft. What is the total bending moment under the load?

$$M = R_2 b - \frac{wb^2}{2} - \frac{Pl}{8}$$

Writing this out it appears

$$M = (267.5 \times 10) - \frac{9 \times 10^2}{2} - \frac{600 \times 3}{8}$$

$$= 2675 - 450 - 225 = 2000 \text{ ft.-lbs.}$$

The formulas for the reactions are the same as though the load was concentrated at a point.

For two equidistant loads on a beam, as in Fig. 18, the formula for the reactions reads

$$R_1 = R_2 = P + \frac{wL}{2}$$

The moment due to the loads only is a maximum under each load and is constant at all points on the beam between the loads.

$$M \text{ (for loads only)} = Pa$$

This can be proved. The loads being placed on the beam at the same distance from the end, call each load P. Then the total load $= 2P$. One-half of the total load goes to each end, so that the reaction must be $\frac{2P}{2} = P$. The moment is equal to the reaction multiplied by the arm through which it acts, therefore $M = Pa$.

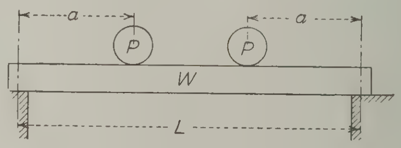


Fig. 18—Two Equidistant Concentrated Loads on Beam on Two Supports as Shown

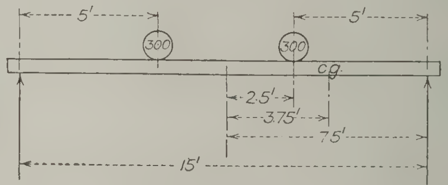


Fig. 19—Diagram Illustrating the Example

Adding the weight of the beam gives us under the load, $M = R_2 a - \frac{wa^2}{2}$.

in which w = weight per lineal foot of beam
a = length of beam between load and reaction.

To prove that the moment is the same under the middle of the beam as it is under each load we must multiply the reaction by half the span and subtract from it the load multiplied by half the span minus the length of the arm from the load to the reaction. The full written out expression is as follows,

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$$M = P \times \frac{L}{2} - P\left(\frac{L}{2} - a\right) = \frac{PL}{2} - \frac{PL}{2} + Pa = Pa$$

(**Note.**—In the above expression algebra has been used for the first time. The product of two positive (+) quantities is positive. The product of two negative (—) quantities is negative. The product of a positive (+) and a negative (—) quantity is negative. In the above expression where the subtraction is indicated, the load P is negative and the first quantity within the parenthesis is positive, for when no sign is written the positive

(+) sign is understood. The second quantity is negative. By clearing away the parenthesis and multiplying each quantity within by the load we obtain $+\frac{PL}{2}$ and $-\frac{PL}{2}$, which of course cancel each other, leaving Pa, for P = reaction when weight of beam is neglected.

Example—Fig. 19.—A beam 15-ft. long, weighing 9 lb. per lineal foot carries two loads of 300 lb. each at points distant 5 ft. from the ends. Find the bending moment.

First.—Under each load for the loads only.

$$M = Pa = 300 \times 5 = 1500 \text{ ft. lb.}$$

This moment is constant for each point on the beam between the loads.

Second.—Under each load for the load and the weight of the beam.

$$R_1 = R_2 = P + \frac{W}{2} = 300 + \frac{9 \times 15}{2} = 367.5 \text{ lb.}$$

$$M = (367.5 \times 5) - \left(\frac{9 \times 5^2}{2}\right) = 1725 \text{ ft. lb.}$$

This moment is not constant for the weight of the beam between the loads must be considered. The increase is slight and usually is negligible except in the case of concrete slabs, in which the dead load often equals or exceeds the live load. This example will be worked out in detail, there being four distinct steps.

First.—Total moment at middle of beam $= R_2 \times \frac{L}{2}$.

Second.—Moment due to weight of half the beam. The weight $= \frac{wL}{2}$. Multiply this by the distance from the middle of the span to the center of gravity of half the beam $= \frac{L}{4}$. This reduces to $\frac{wL}{2} \times \frac{L}{4} = \frac{wL^2}{8}$, to be subtracted from the total moment, which took into consideration the weight of the beam. This gives $M = \left(R_2 \times \frac{L}{2}\right) - \frac{wL^2}{8}$.

Third.—The moment due to the concentrated load must be subtracted. The load is multiplied by the distance from the middle of the beam to the load $= \left(\frac{L}{2} - a\right)$; this giving $P \times \left(\frac{L}{2} - a\right) = \frac{PL}{2} + Pa$, and as this is to be subtracted the minus sign is placed before $\frac{PL}{2}$.

Fourth.—The whole expression now appears,

$$M = R_2 \times \frac{L}{2} + Pa - \frac{PL}{2} - \frac{wL^2}{8}.$$

When adding positive and negative quantities add each kind separately. Take the difference of the sums and prefix the sign of the greater sum. By enclosing the two negative quantities in a parenthesis the sign of the second is changed, so the full expression may be written

$$M = \left(Pa + \frac{R_2 L}{2}\right) - \left(\frac{PL}{2} + \frac{wL^2}{8}\right).$$

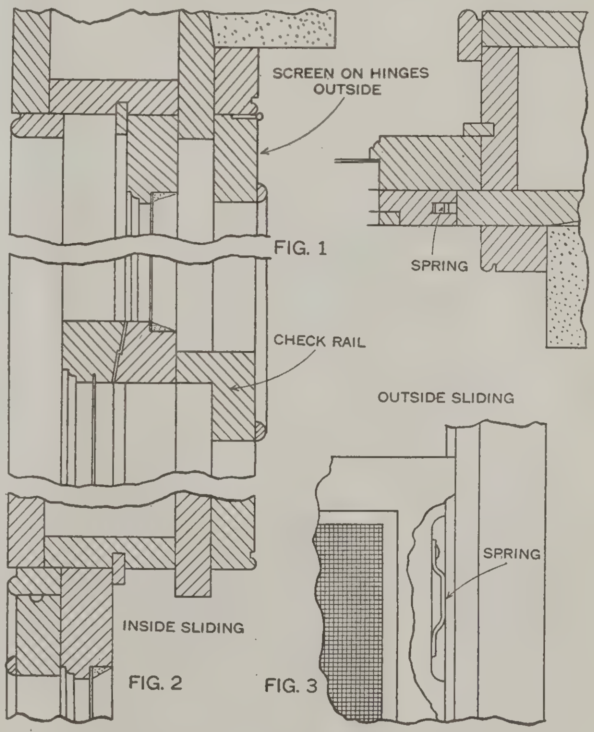
The arithmetical work is simple, as here shown

$$M = (300 \times 5 + 367.5 \times 7.5) - \left(300 \times 7.5 + \frac{9 \times 225}{8}\right) = 1753 \text{ ft. lb.}$$

(*To be continued.*)

Constructing Frames for Fly Screens

Although somewhat late in the season to talk about the making of fly screen frames, yet the suggestions presented herewith may be of such value as to be utilized during the winter or early spring months by those interested in this particular class of work. The comments which are here presented were contributed by John Wavrel, Jr., to a late issue of the *Wood Worker*. He points out that although at first glance the subject does not seem to be of any great importance, still when one comes in contact with the peculiar requirements of specific cases it assumes an aspect of greater interest and is not without some difficulties.



Constructing Frames for Fly Screens

He says some people will require a screen covering the whole window, opening on the outside. This is certainly an easy matter, providing there are no shutters or blinds at the window. However, if the frame is supplied with either of these it is almost impossible to place a screen on the outside because of the fixtures with which the shutters or blinds are supplied to keep them open. In a case of this kind it is placed on the inside, directly on the sash bead and covering the lower sash only, the screen being arranged to slide up by means of a strip tacked on the sash bead and the stiles being plowed to receive the strip, as shown in Fig. 1 of the accompanying illustration.

If the screen is placed on the outside, covering the lower half of the window, it may be hung on hinges to the hanging stile of the frame and provided with a check at the top rail, which meets the check rail of the top sash and shuts off all means of entry for the fly. This method is shown in Fig. 2. Another method is shown in Fig. 3, which provides for a sliding screen which is placed on the blind stop and slides up, being held in position by means of a spring.

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The Advantages of "Pulling Together"

The following extracts from the Monthly Letter of Secretary W. H. Sayward of the Master Builders' Association of Boston are highly significant in their application:

"The only way in which the general welfare of society, or of any section of society, can be attained is by the individuals composing society or the section "pulling together!"

But people either in society at large or in divisions covering special interests are prone to delay taking measures either for protection or advancement until they suffer from some sharp pinch of adverse conditions; then they fling themselves together hurriedly, and act hurriedly, with the almost unavoidable result that the action taken is crude and unsatisfactory, fails to cover the ground, and, to greater or less extent, prejudices the situation rather than improves it.

"To 'pull together' effectively there must be something better than spasmodic action. In the first place, there should be an equipment fitting for the "pull." To use a homely simile, a team of horses may be strong and willing, but unless they be fitted with harness of the kind and quality equal to the load they are to pull, and have systematic training and direction when in harness, there will be great likelihood that their strength and willingness will not accomplish what it should, and, on the contrary, may result in disaster.

"For men to accomplish anything worth while, to make their 'pulling' really amount to a 'together' pull, they have got to be sufficiently impressed with the significance of united action to give time and thought to the building of machinery for the service.

"In other words, men do not expect to do good work without proper tools for the job, and the job of 'pulling together' is of all jobs the one which requires most perfect tools, tools which cannot be made in a hurry.

"This is what associated effort, if properly conducted, provides—machinery devised with deliberation and prior to any applied pressure. Then this machinery must be kept constantly under inspection, improved as experience dictates, oiled and ready for service at a moment's notice. Very often the mere fact that this machinery is known to exist, and is ready to be put in operation, prevents the movement of antagonistic forces.

"Our Association is an example of just this effectiveness. It keeps constantly in condition to respond to the call of its members when the need of 'pulling together' presents itself; no waiting for steps to be taken to organize, but ready to strike, and strike with precision, the needed blow."

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Tests Showing Strength of Wood

A series of tests on American woods and other materials made at the Mechanical Engineering Department of the Northampton Polytechnic Institute, London, England, demonstrates the fact that the most reliable test is by crushing short blocks in the direction of the grain rather than at right angles to it, for the reason that the strength along the grain is much greater than the strength across it.

Some specimens were soaked in water for one to three weeks. This decreased the resistance in all cases to compression but affected certain woods more than others.

After one week's soaking, birch had but 57 per cent. of the strength when dry. After two weeks' soaking it had but 53 per cent. of the dry crushing strength.

When soaked for a week, elm and teak were superior to the other woods tested. After two weeks' soaking, elm has greater over teak although it also decreases in value. Elm and teak were thus shown very serviceable for use in water.

Quite a useful proportion was found in figuring the relation of the crushing strengths of the various woods to the weight in pounds per cubic foot. An approximation was 165. Use of this factor is suggested that knowing the weight of a wood in pounds per cubic foot we can then by multiplying by 165 find the approximate crushing strength in pounds per square inch.

Failure of the wood specimens in the testing machine showed that when a piece had failed, many of the fibers still possessed much elasticity. On releasing the load in machine there was sometimes as much as a recovery or spring of one inch where the compression had been about two inches. Pointer of the testing machine would rise and fall slightly as pressure was applied, indicating that the specimen would hold the load for a short period and then compress slightly, repeating this until failure.

Average Stresses in Pounds per Square Inch on Woods and Their Comparative Strength

Woods	Average Stress	Comparative Strength
Mahogany	7430	1.50
Teak	7420	1.50
Yellow deal	6960	1.4
Ash.	6330	1.28
American whitewood	5880	1.18
Birch	5800	1.17
Beech	5470	1.10
Elm	5300	1.07
American oak	5050	1.02
Pitch pine	4960	1.00

The table shows the average stresses in pounds per square inch of the various woods under test and their comparative strength, the weakest wood being taken as unity.

A Summer Lodge at Manchester, Mass.

An Excellent Example of Domestic Architecture—Layout of the House and Its Exterior Treatment

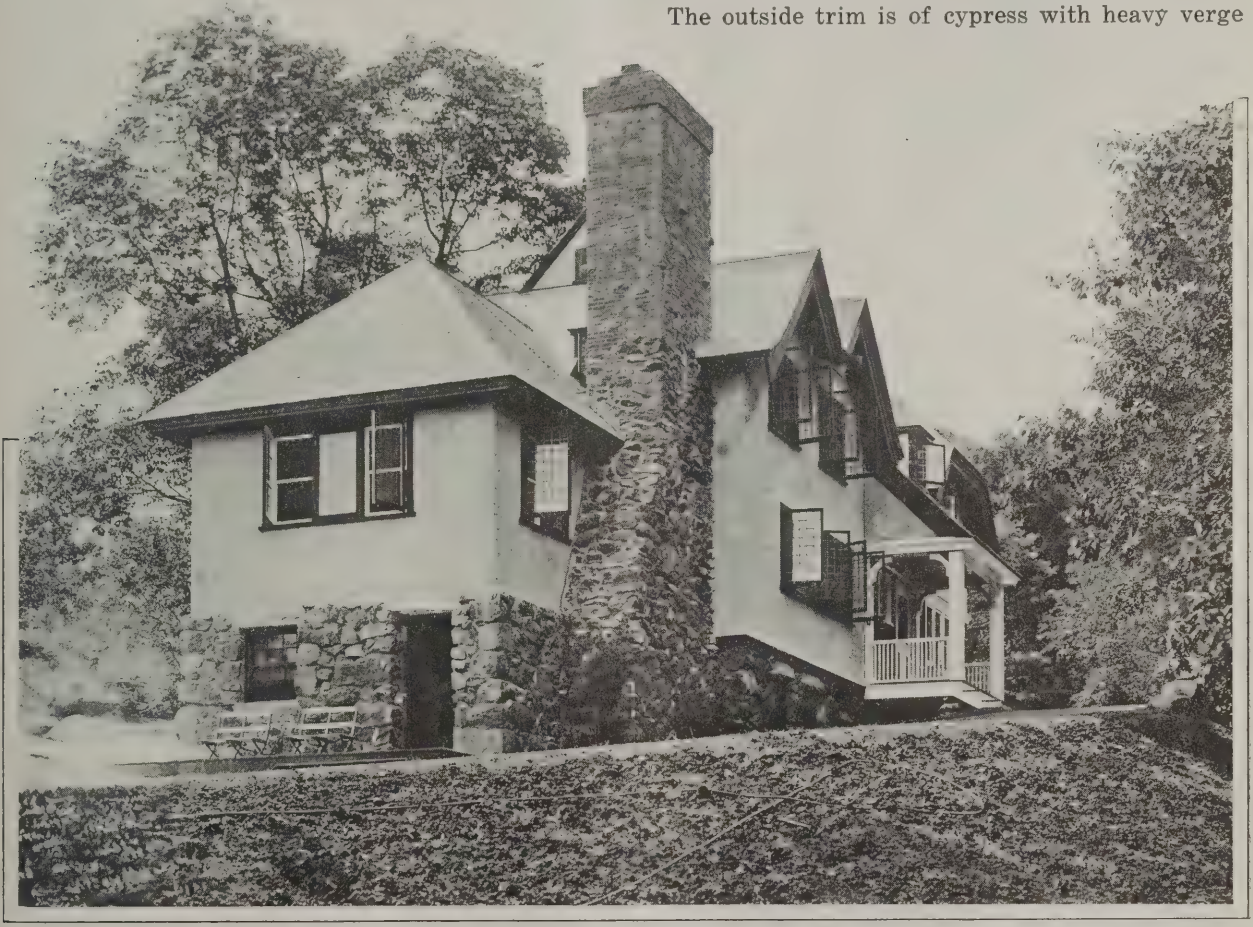
IT is generally conceded that along the Eastern coast line of the State of Massachusetts and especially that section lying north of the city of Boston are to be found some of the most attractive examples of domestic architecture in the way of summer homes that there are in the country. One of the delightful spots where those endowed with an abundance of worldly goods foregather during the heated term is Manchester-by-the-Sea, and among the gems of domestic architecture there located is the lodge illustrated upon this and the pages which immediately follow.

It will be seen from the picture that the house is of cement exterior with many gables and dormers, foundations of field stone laid up with rugged effects and an outside chimney which to the eaves is also of field stone, while above it is of brick with here and there a rough stone inserted to give the desired effect. At the living room end the exterior of the first story is covered with siding and the gable is stucco finish.

The framing is of spruce, the sills being 6 x 8 in., the girders 6 x 10 in. and 4 x 10 in., the corner posts 4 x 6 in., the plates 4 x 4 in. and 4 x 6 in. the floor joists 2 x 10 in. and the second floor sill joists 2 x 8 in. All floor framing is spaced 16 in. on centers. The rafters are 2 x 7 in. and 2 x 8 in. spaced 20 in. on centers. The outside studding is 2 x 4 in., while the interior studs are 2 x 4 in., placed flat-wise and spaced 16 in. on centers.

The floors are double but with no deadening felt between. The finish floors of dining room, living room, smoking room, corridors, hall and china closet are 3½ in. rift North Carolina pine matched, while the rest of the flooring is slashed pine.

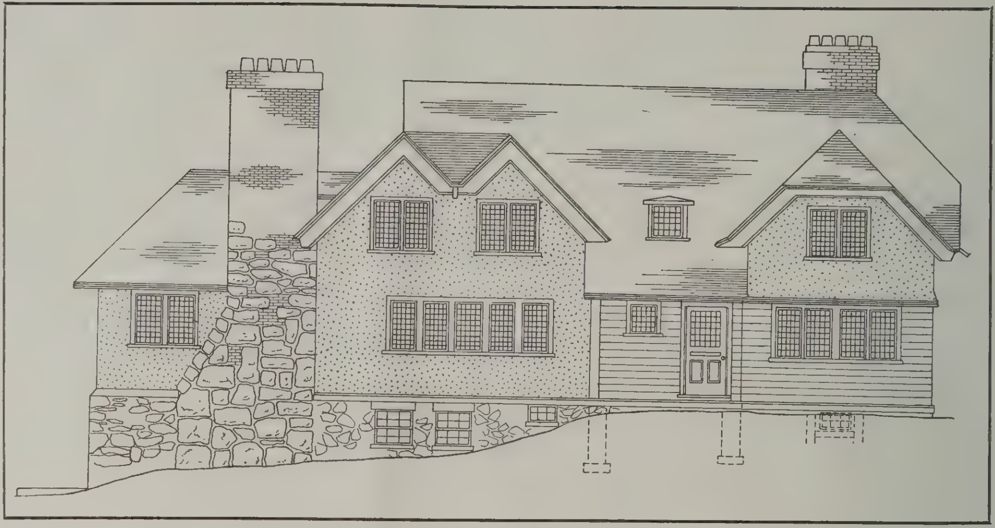
The outside trim is of cypress with heavy verge boards stained dark brown. The inside trim is cypress of a simple pattern. The roof is covered with cedar shingles left to the weather.

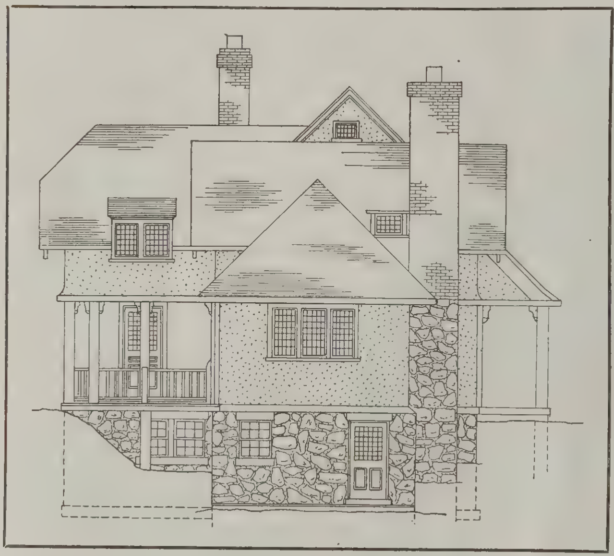


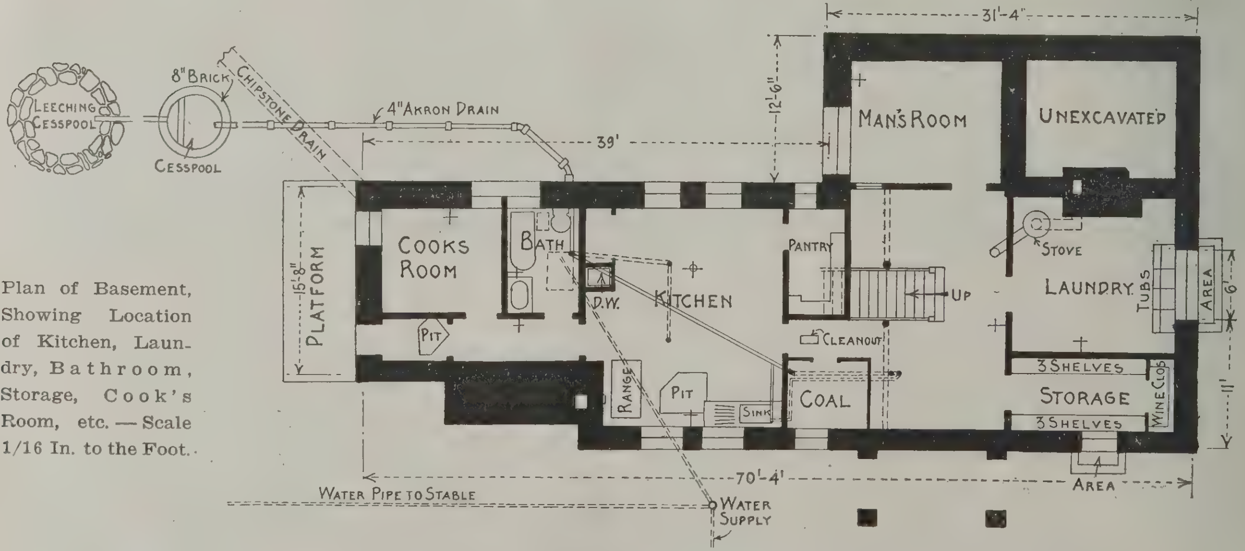
A Summer Lodge at Manchester, Mass.—Architect, R. Clipston Sturgis, Boston, Mass.

One of the half-tone engravings represents a view of the lodge looking toward the kitchen end and clearly indicating the outside chimney and the rough effects produced by the use of miscellaneous field stone. The other half-tone engraving represents a view in the dining room looking toward the triple window at the end.

Referring to the floor plans it will be noticed that the culinary department is located in the basement but at the end of the house which, by reason of the slope of the ground, gives the basement a full story in hight. A dumbwaiter passes from the kitchen to the china closet adjoining the dining room on the first floor. The kitchen is equipped with a sink; a range with hot water boiler suspended directly over it and on the opposite side of the room is a kitchen dresser facing which is a commodious pantry lighted by an outside window. Leading from the kitchen at the left is a passage-way from which opens the cook's room and the bath room. At the opposite end of the basement is the laundry with four-part wash tubs and a jacketed laundry stove.


The Northeast Front Elevation Showing Treatment of Various Areas—Scale 1/16 In. to the Foot


The Southeast End Elevation—Scale 1/16 In. to the Foot



Plan of Basement, Showing Location of Kitchen, Laundry, Bathroom, Storage, Cook's Room, etc. — Scale 1/16 In. to the Foot.

A Summer Lodge at Manchester, Mass.—Architect R. Clipston Sturgis, Boston, Mass.

At the extreme right-hand end of the lodge on the main floor are living room and smoking room, each having an open fireplace as a feature. A Dutch door establishes communication between the smoking room and the piazza which extends more than half the length of the building. A long corridor connects the living room with the dining room and opening from this corridor is a passageway leading to the basement stairs and also to the servant's and nurse's rooms.

The main stairs rise from the hall which is entered at both front and rear of the house through Dutch doors.

The piazza has a hard pine floor laid over tar paper mopped with tar. The under floor is of spruce.

The servant's and nurse's rooms on the main floor are warmed through registers connected with an opening in the kitchen ceiling directly below. On the second floor are five sleeping rooms and two bath rooms. The two bedrooms directly over the living and smoking rooms are each fitted with an open fireplace. The master's room in the right-hand front corner of the building has opening out of it one of the bath rooms which is also accessible from the main hall.

The doors on the main floor are 3 ft. by 6 ft. 10

in., while those on the second floor are 2 ft. 10 in., by 6 ft. 10 in. All casement windows open outward.

The summer lodge here described is that of Prescott Bigelow at Manchester, Mass., and was erected by Samuel R. Dexter, Beverly, Mass., in accordance with plans drawn by Architect R. Clipston Sturgis, 120 Boylston Street, Boston, Mass.

Public Conveniences in the City of London

There are over 300 public conveniences in Greater London, about 200 of which are for men, the remainder for women. In the city of London proper there are 47 stations—31 for men and 16 for women. These conveniences are built and maintained by the several city and borough councils, there being 29 such bodies in Metropolitan London.

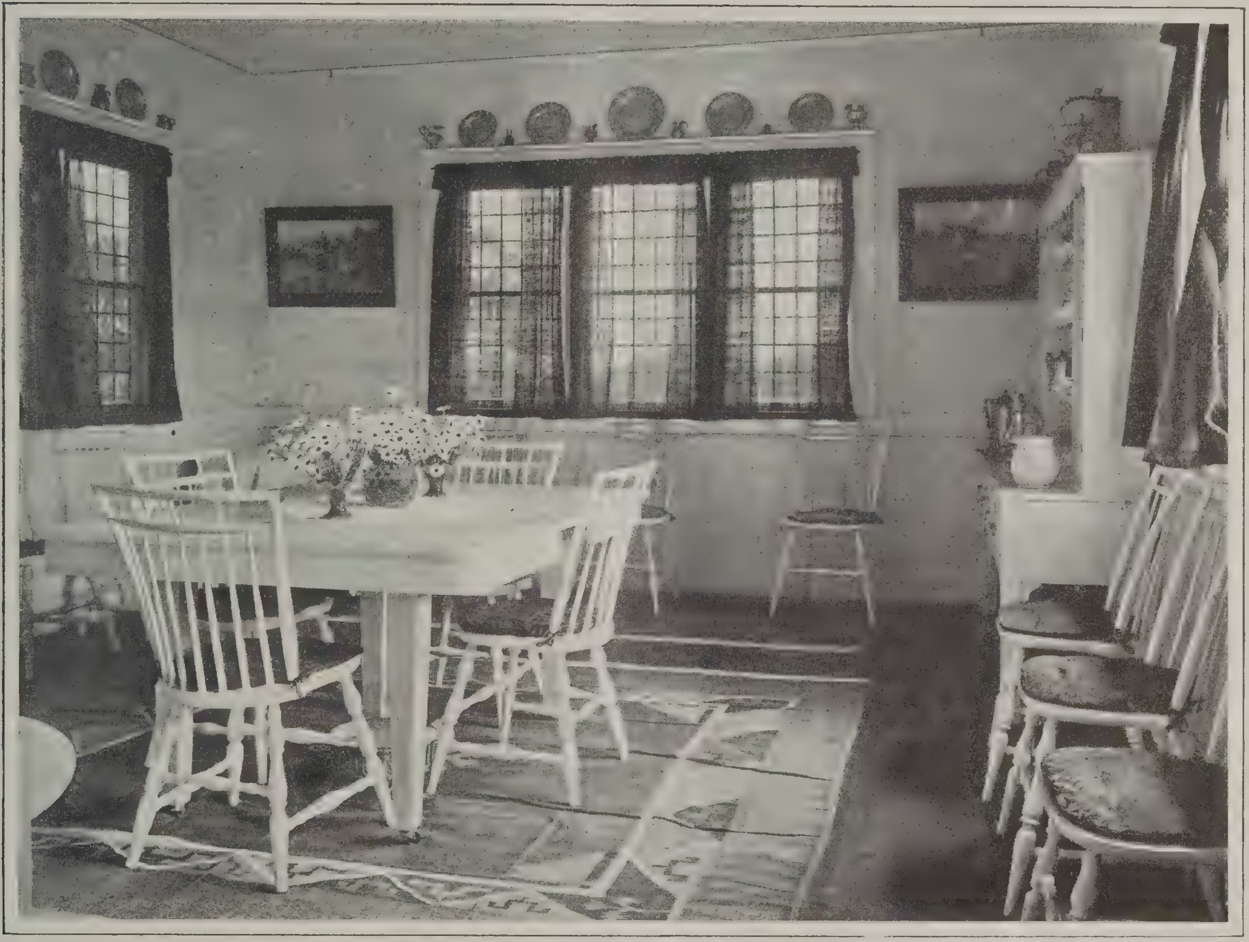
The stations are invariably underground and are fitted with urinals, water-closets, lavatories, and in some instances with dressing rooms. Light is obtained by prismatic pavement glass, supplemented usually by electricity. The 47 stations in the city contain 283 water-closets (of which 27 are free), 100 lavatories, two dressing rooms, and 353 urinals. The hours during which they are open vary from 5 and 7 a. m. to 11 and 11.30 p. m. on week days, and, where open, usually from 9 a. m. to 11 p. m. on Sundays. In some of the boroughs certain conveniences remain open until 1 a. m. on week days and until 11.30 p. m. on Sundays. There are usually two attendants to each convenience, working in shifts, but in the larger stations (men's) three men and one boy are employed. The wages paid are not uniform throughout the metropolis.

In Westminster men attendants receive uniform clothing and $7.30 per week, and women attendants $6.09 per week. The latter must provide their own uniforms, consisting of a black gown, white apron, collar and cuffs. In the city the wages vary according to the station, and a part only of the cost of uniform is paid by the corporation. An inspector makes periodical rounds of the several stations in order to see that they are properly cared for.

The charge for the use of a water-closet is 2 cents; for the use of a lavatory with hot or cold water and clean towel, 4 cents; and for a dressing room, 12 cents.

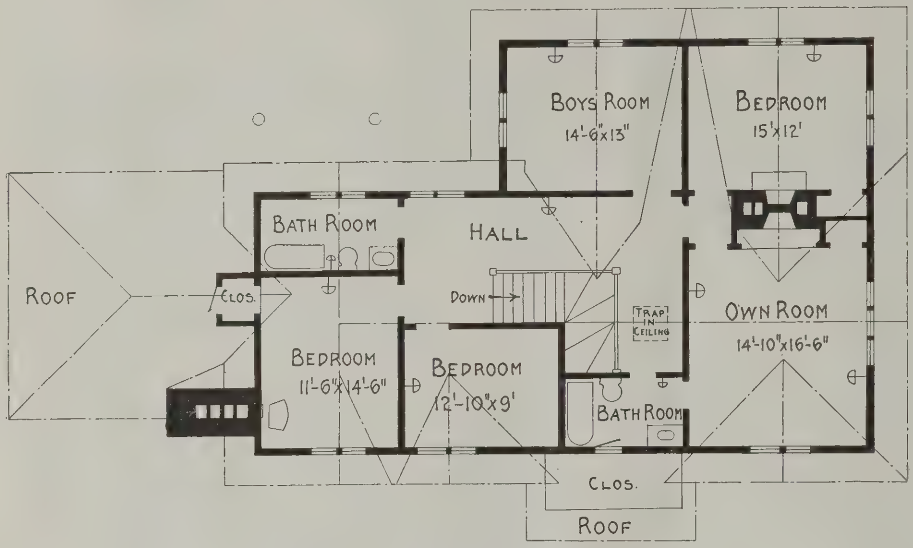
Where coin locks are in use, attendants must not take or handle money except to supply change when desired, and receive the fees for use of lavatories and dressing rooms. Substantially the same rules obtain in similar conveniences at the large railway stations, which, at the termini, are usually available for the general public, whether traveling or not.

The locks used on the doors of the water-closets are invariably automatic coin-slot devices, in which the catch is released by the dropping of the required coin. A dial is arranged to show through a slot in the face of the lock the word "Engaged" or "Vacant" according as the door is closed after entry or after exit.

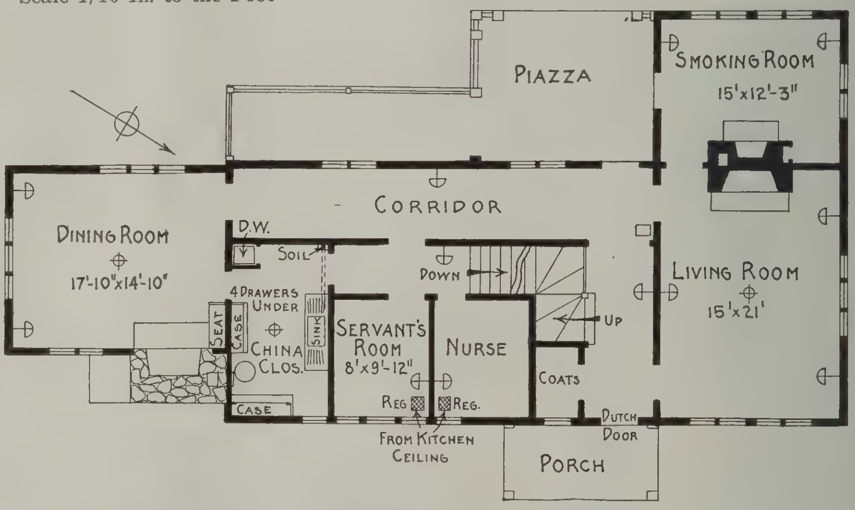


A Summer Lodge at Manchester, Mass.—View in Dining Room Looking Toward End Windows

There are several locks on the market. The one exclusively used in the city is supplied by a London concern. It is stated, however, that experiments are being made with a new registering lock, with coin-collecting box, which has been made by one of the corporation's employees. Other locks in use in the several boroughs are manufactured by several London firms. In all cases the locks are patented and are not leased from the patentees but purchased outright from the manufacturers. The persons authorized to do the contracting for the equipment of these conveniences are the health officers of the different borough (or municipal) councils. The actual construction and fitting up is confined practically to four or five firms who specialize in this class of work.



Second Floor Plan—Scale 1/16 In. to the Foot



Main Floor Plan—Scale 1/16 In. to the Foot

A Summer Lodge at Manchester, Mass.—Architect R. Clipston Sturgis

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Cleaning Terra Cotta

In connection with the walls of a brick building it was desired to clean and brighten the terra cotta trimming, the bricks being of a deep tan color, while the terra cotta was of a light cream that had turned dark and was unsightly from many years' exposure. In answer to this question by a correspondent of the *Painters Magazine*, the latter furnishes the following: The simplest way to accomplish this is to mix two pounds of powdered pumice and one pint of liquid ammonia with one gallon of soft soap, applying the mixture to the surface to be cleaned with a fibre wall brush, allowing it to remain about thirty minutes. Then rub briskly with a good scrubbing brush. When on trial it shows that the compound has done its work, clean it off with lukewarm water by using a large sponge and rinse, if possible, with a hose, otherwise with the sponge and a liberal supply of clear water. If after drying the terra cotta appears dull, it may be revived by rubbing it over with a cloth saturated with kerosene oil, which will give it somewhat of a "sheen."

Handsome Factory Buildings

Following the example set last year in the Gray and Davis Building, erected by the Aberthaw Construction Co. of Boston, Mass., from designs of Monks and Johnson, of that city, the same arrangement, with the same combination of architects and builders, is being put into a new building for the Dennison Mfg. Co. at South Framingham, Mass. Tapestry brick facing is to be used in ornamental end bays of the building, as well as in the wall beams beneath windows. The new structure, of reinforced concrete, will be five stories high and measure 72 ft. by 160 ft. The estimated cost is about $110,000. For excavation a Thew steam shovel of 5/8-yd. capacity is being used.

A building somewhat similar in general appearance is a mill just started by the Aberthaw Construction Co., as engineers and contractors, for The Stanley Works of New Britain, Conn. In this case the decorative effects will be furnished by vitrified tile on the end panels and curtain walls. This building, which will be seven stories in height, and will be devoted to the manufacture of hinges, measures 202 ft. by 52 ft. 4 in. The estimated cost is $125,000.

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The "call to arms" which has echoed around the world has resulted in the temporary breaking up of at least one of New York's well-known architectural firms. As a consequence of England's call Paul Phipps, of the firm of Albro & Phipps, has recently sailed for that country in order to enter the British army. The work of the firm will be continued by Lewis Colt Albro at his present office, No. 2 West 47th Street.

Scale of Wages in the Building Trades

Some Interesting Comparisons of Figures in Three Groups of Cities as Revised to July 1, 1914

IT will be recalled that last year we presented a table showing the rates of wages per hour paid in various branches of the building trades in this country and herewith we give figures covering practically the same cities and revised up to July 1.

Rates of Wages, per Hour, Paid in Various Branches of the Building Trades

Name of City	Masons and Brick-layers	Structural Iron Setters	Plasterers	Lathers	Plumbers	Steam Fitters	Carpenters	Painters	Sheet Metal Workers	Electrical Workers	Roofers	Cement Finishers	Laborers and Hod Carriers
Boston	65	56¼	65	$3 per M 60 per hr.	65	56¼	55	55	55	56¼	Comp. 31½ Slate 55	62½ to 65	L. 30 H.C. 30 to 35
Hartford	65	55	65	55	55	55	50	50	50	48	50	65	L. 25 H.C. 37½
New York City	M. 60 B.L. 75	62½	68¾	62½	68¾	68¾	62½	50	62½	60	Metal 62½ Comp. 43¾	62½	L. 25 H.C. 37½
Philadelphia	M. 55 B.L. 65	60	62½	62½	50	50	55	45	45	40	45	45	L. 17 to 25 H.C. 35 to 40
Washington	66⅔	56	62½	$2.25 per M	50	52½	50	50	50	55	50	45	L. 20 H.C. 28¼
Atlanta	45	62½	45	30	50	45	30	33	40	40	35	45	15c
Jacksonville	B.L. 62½	50	50 to 62½	37½	50	50	34⅜ to 37½	33	40	39 to 45	37½	33	L. $1.50 H.C. $1.50 to $1.75
St. Paul	M. 65 B.L. 70	50 to 62½	62½	Wood 50 Metal 55	62½	62½	45 to 50	50	42½ to 45	50	Grav. 30-35 Slate 45-50	50	L. 20-22½ H.C. 25-30
Chicago	75	68	75	71⅞	75	75	65	70	68¾	75	65	65	40c
Cincinnati	M. 60 B.L. 70	62½	75	68¾	62½	60	55	50	45	50 to 55	45	50	L. 25 H.C. 25 to 40
St. Louis	M. 70 B.L. 75	60	75	68¾	66¼	75	62½	60	60	65	55	60	L. 20-37½ Brick 47½ Mor. 50
Memphis	M. 65 B.L. 75	65	75	Wood 50 Metal 62½	62½	62½	50	52½	50	45	55	62½	L. 20 H.C. 30
New Orleans	62½	62½	62½	50	56¼	56¼	35 to 45	37½ to 40	45	37½ to 50	38	30-35	L. 15 H.C. 30
Denver	M. 62½ B.L. 75	56¼	75	50 to 56¼	62½	62½	60	50	56¼	37½ to 50	37½	68¾	L. 37½-40 H.C. 37½ to 40
Salt Lake City	M. 62½ B.L. 80	62½	75	62½	75	75	62½	62½	57½	56¼	50	62½	L. 31¼ H.C. 62½
Seattle	M. 56¼ B.L. 75	56¼	75	62½	62½	62½	50 to 56¼	56¼	56¼	62½	50	62½	L. $2 to $3.50 H.C. $4 a d.
Portland, Ore	M. 62½ B.L. 75	75	75	62½	75	75	50	50	$4.50 per day	43¾	40	50	L. $2.50-$3.00 H.C. 50
San Francisco	87½	62½	87½	62½ to 75	75	75	62½	59⅜	68¾	62½	75	75	Brick 50 Plas. 62½ H.C. 31¼
Los Angeles	M. $5.50 per day B.L. 75	38 8-9	75	$2.25 per M	56¼	56¼	50	43¾	50	43¾	43¾	62½	L. 34⅜ H.C. 37½
San Antonio, Texas	M. 75 B.L. 87½	62½	75	50	56¼	62½	45	45	50	56¼	50	50	L. 21⅞ to 25

In selecting the cities we have taken a few along the Atlantic seaboard, a second group extends from north to south through the central portion of the country, while a third group embraces some of the extreme western points, ranging from Denver and Salt Lake City to the Pacific Coast. The figures are taken from the official schedule of 67 cities in the United States and Canada compiled by E. M. Craig, secretary of the Builders' Association, 808 Chamber of Commerce Building, Chicago, Ill.

It will be seen from a study of the table that most of the trades operate under an hourly scale, although some are paid a stated sum per day. A comparison of these figures with those contained in the table published in September last shows that where changes have occurred they are for the most part in the nature of increases. These have occurred in Boston, Hartford, New York City, Philadelphia, Washington, Atlanta, Jacksonville, St. Paul, Chicago, Cincinnati, St. Louis, Memphis, New Orleans, Salt Lake City and Portland.

The cities in which there are some branches of the building trades where a lower rate of wages prevails than was the case a year ago, include Jacksonville, St. Louis, New Orleans, Seattle and Portland, Ore.

In addition to the information given in the table it may be stated that in Atlanta cutters, setters and iron workers have an eight hour day; roofers work ten hours and mechanics in other branches nine hours. In St. Paul the hoisting engineers and laborers work ten hours. In Memphis the cement finishers work ten hours and the marble cutters have "open shop."

In San Francisco laborers receive from $2.50 to $3 per day; structural iron workers, inside, receive 42½ cents per hour and work nine hours; the painters receive 62½ cents up to December 1, 1914.

In Los Angeles plasterers' laborers receive 50 cents per hour, which is the same scale as 1913.

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A Federation of Secretaries

One of the features in connection with the Ninth Annual Summer Meeting and Picnic at Cedar Point of the Ohio Builders Association, held in August, was the formation of what may be termed "A Federation of Secretaries." This was composed of men looking after the interests of the various building material associations in Ohio and included among others J. C. Neeley, of the Ohio Builders Supply Association, Edward A. Roberts, secretary of The Builders Exchange, at Cleveland; James Carson, of Dayton, state secretary of the Hardware Dealers Association; W. A. Phelps, secretary of The Builders Exchange at Dayton and state secretary of the Ohio Retail Lumber Dealers Association; F. M. Grant, of Cleveland, state secretary of the Electrical Contractors' Association, and W. J. Duffy, of Toledo. It is understood that other supply associations will be asked to co-operate and bring about an exchange of ideas as to how to best handle legislative and building laws and co-operate more closely for the better protection of the industry.

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Lumber Production in 1913

The production of lumber in the United States in 1913 was, according to the official figures just issued by the United States Department of Agriculture, about three-quarters of a billion board feet less than in 1912. Last year 21,394 mills reported a production of 38,387,009,000 board feet as against 39,158,414,000 feet reported by 29,648 mills in 1912, and 37,003,207,000 feet reported by 28,107 mills in 1911. The high-water mark in lumber production was set in 1909 when the cut exceeded 44,000,000,000 feet. In 1907 and 1910 the cut was slightly over 40,000,000,000 feet. No other years have come up to the record of the last two years.

Notwithstanding curtailment in the production of yellow pine and Douglas fir, the reported cut of yellow pine was about seven-tenths of one per cent. and of Douglas fir about 7½ per cent. greater in 1913 than in 1912. The cut of Douglas fir last year was the largest ever reported, while the cut of yellow pine was second only to that of 1909. Had not enforced curtailment in the output of these two woods been necessary the total lumber production of 1913 would undoubtedly have exceeded that of 1912. In fact, had not the cut of white pine, hemlock, spruce, oak and maple declined in 1913, the increased cut of yellow pine, Douglas fir, cypress and red gum in that year would have carried the total beyond that of 1912.

The reported production of 4,592,055,000 feet in Washington in 1913 was the largest ever recorded in that or any other State. The largest production previously reported by one State was that of 4,311,240,000 in 1890 by Michigan.

Valuable tables are given in the report of the department showing the number of mills and lumber production by States; also the cut of various kinds of wood. These reports were secured and the data compiled by the Bureau of Crop Estimates of the Department of Agriculture in co-operation with the Forest Service. The figures show that about 60 per cent of the total number production in 1913 was sawed by mills cutting 10,000,000,000 feet and over annually. Some of these mills cut only one kind of wood, such as yellow pine or Douglas fir, but others cut several kinds.

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Housing Conditions Compared

At a recent meeting of the State Housing Association in Harrisburg, attention was called to the period when carelessness and wastefulness was permitted in connection with insanitary and inadequate buildings for housing the poor. It was pointed out that in many instances the older tenements and cheaper class of houses have been replaced with those of a better grade, and, it is stated, that the small houses are now equipped with conveniences that were unknown even in pretentious houses a quarter of a century ago.

Now, hot and cold water, inside plumbing, general heating and bath rooms are included in many of the houses occupied by even the poorer classes. There can be yet devised for installation at a low cost, plumbing systems and heating systems that would add still more to the health and comfort of those who occupy even the cheapest class of buildings. A house built without any heating apparatus entails upon the occupant the necessity of spending a considerable sum for heating and cooking stoves for the family, and, if this outlay is not made, the house, during the winter season, contains the same air at the end that it did at the beginning, and a damp, chilly atmosphere.

This condition can be changed by the installation of heating systems which would be so inexpensive that they would not amount in price to that of a high-grade parlor heater for one room. Unfortunately there is nothing to compel progress in this particular line, while, in so far as plumbing is concerned, the necessity of providing a water supply, and the prohibition of the use of privy vaults, insures both a water supply and a sanitary disposal of the house sewage.

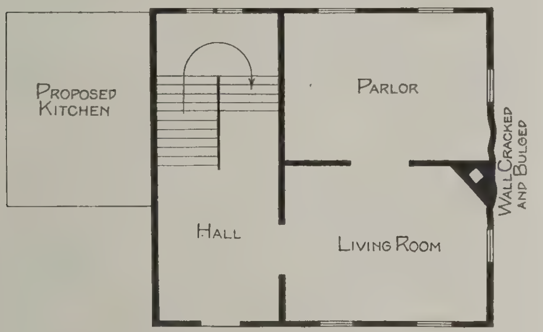
It remains for someone to prove to the satisfaction of the multitude, so as to create a demand, that the cost of a heating equipment for a small home is so small that the interest on the investment will not substantially increase the rent.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

Remodeling an Old Stone House

From V. S., Yeagertown, Pa.—Will some practical builder who has had experience in remodeling and alteration work tell me how to proceed in the case which I shall describe. We have an old stone house, 28 x 30 ft. in plan, and two stories in hight. There are three sides which are as good as the day the house was built, but the fourth side, in the center where the chimney occurs, is bulged out and cracked for perhaps 6 or 7 in. at the worst place. This was caused by a cistern near the foundation walls leaking and softening the ground under the weight of the chimney. How can we fix the wall?



Remodeling an Old Stone House

Can we make the wall damp-proof by using some one of the many waterproofing compounds now on the market, or what is the best plan to follow?

We intend to put on a new roof and porch, and wish to ask how to finish the roof. We want plenty of porch room, and wish to know what style will give the best results.

The accompanying plan is a rough outline of the first floor, the second floor having about the same layout. The proposed kitchen is indicated at the left in the shape of an extension. The door under the stairs can be cut out if necessary. It is 16 to 20 ft. from the ground to the square of the house. The crack in the wall is indicated on the right-hand side of the plan, the dotted lines indicating the roof.

Constructing a Poultry House

From F. D., Bronx, N. Y.—Will some of the practical readers of the paper give me the best points in regard to building a chicken house of a size to accommodate nine hens and a rooster. I would appreciate it if the information is accompanied by a plan and elevation.

What I desire to know more particularly is the sanitary feature of the coop. Is a concrete cement floor regarded as satisfactory for the purpose?

Note.—It is possible our correspondent may derive valuable hints and suggestions from the article on poultry house construction which appeared in the issue of *The Building Age* for November, 1912. Although much larger than the specific case which he mentions would seem to require, yet he may find many points that can be utilized for the smaller house, more especially as regards floor construction, lighting, arrangement of the roosts, etc. We shall, however, be glad to have our practical readers discuss the requirements of this correspondent in the light of their own experience.

Proper Proportions of a Flag Pole

From W. R., Waldin, N. Y.—Will some reader of *The Building Age* kindly give rules covering the following:

First, what should be the length of a flagpole in relation to the perpendicular hight of the building measuring from the ground to the bottom of the pole; also, when the pole is placed at the top of the building?

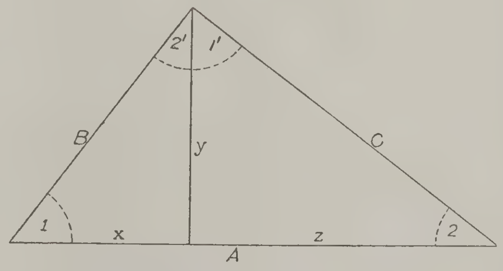
Second, what should be the length of the flag in relation to the length of the pole when the pole is placed at the top of the building?

Third, what should be the length of the flag in relation to the length of the pole when the pole is set in the ground?

In all cases the length of the pole is to be the exposed part.

Obtaining Cuts of Gable Rafters

From C. G., Ithaca, N. Y.—In my answer to "W. X. Y. Z." on page 50 of the July issue of *The Building Age* the word "ridge" appearing in the diagram, Fig. 1, means a dimension equal to the length of the ridge instead of location of ridge.



Obtaining Cuts of Gable Rafters

"C. J. M." gives a formula to be used in determining the lengths of x and y in his diagram on page 51. His formula is all right and geometrically correct and should be understood by every carpenter and builder.

Thinking, however, there may be some readers who have not had a pull at the roots (involution and evolution), I beg to submit a method I use which is also capable of geometrical proof and leaves the values of x and y in a simpler form.

Referring to the diagram, given the sides of a right triangle $A\ B\ C$ to find the lengths of the sides x and y of the right triangle $B\ x\ y$ formed by drawing a perpendicular y from the right angle of the given triangle $A\ B\ C$ to the hypotenuse A.

The two right triangles $B\ x\ y$ and $C\ x\ y$ into which the given triangle $A\ B\ C$ is divided are similar to it and to each other; therefore, their corresponding angles are equal and their corresponding sides are in the same proportion and for that reason

(1) $A:B = B:x = C:y$

(2) $A:C = B:y = C:z$

(3) $B:C = x:y = y:z$

By (1) $A:B = B:x =$

$$Ax = B^2$$

$$\therefore x = \frac{B^2}{A}$$

By (2) $A:C = B:y$

$$Ay = CB$$

$$y = \frac{CB}{A}$$

$$z = A - x$$

By this formula if the given sides $B = 3$, $C = 4$, $A = 5$ then

$$x = \frac{3^2}{5} = \frac{9}{5} = 1\,4/5 \text{ or } 1.8$$

$$y = \frac{4 \times 3}{5} = \frac{12}{5} = 2\,2/5 \text{ or } 2.4$$

$$z = 5 - 1\,4/5 = 3\,1/5 \text{ or } 3.2$$

The values of both x and y may be obtained from either equation (1) or (2). In the diagram the angle $1 = 1'$, and angle $2 = 2'$. Of course, it is unnecessary to give three members of equations (1), (2) and (3) to determine the values of x, y and z, but I gave them to show the related sides of the given right triangle and the two other right triangles into which the perpendicular y divides the given triangle.

Difficulty in Making Satisfactory Blue Prints

From R. E. B., Clarksville, Tenn.—Several years ago I wrote this department asking for information about blue print making. I believe I have tried every method that was suggested and still I fail to obtain results. Will some one who does know how and has made a success of it every time please tell me how he does it. I want instructions as though I were merely a novice as to paper and where to get it, also whether any kind of bath tray will serve?

Does the age of the chemicals affect their usefulness, should the chemicals be spread on until the paper is thoroughly saturated? Should the print be washed with the print side down? Does partial exposure to light while preparing and washing the print affect it to any appreciable extent.

I would not be selfish enough to ask for this information for myself alone, but I have found others who have "fallen down on the job" as I have.

Why Fireplaces Are Often Unsatisfactory

From H. Bircher, W. Pittston, Pa.—As open fireplaces are becoming more popular each year, perhaps a word concerning them may prove of interest to readers of the paper. In order to obtain the best results each fireplace should have a separate flue. Almost every practical man knows that, but the size of the flue is where the majority of the younger men go astray.

The flue must be large enough to furnish a good draft and carry away the smoke and gases generated. It must not, however, be so large as to take all the heat away with it. The arrangement of the throat has a great deal to do with the latter fault.

I was once called upon to fix a chimney that had blown over. When completed the owner said she wished I would look at the furnace as it heated every room but one and that one was like an icebox all the time. I told her that I knew nothing much about furnaces but would see what I could do. I found that the one room the furnace would not heat was the living room which had in it an open fireplace. I took my pencil and paper, did a little figuring and told her that the flue of the fireplace was altogether too large and was carrying away from the furnace the heat for that room. A damper was needed as there was none in the throat with which to regulate the draft. A flue of about one-tenth the area of the opening has always given the best of satisfaction for me when wood was used as a fuel; for anthracite coal a flue about one-fifteenth the area is a good size. These measurements are for square or rectangular flues. A circular flue would be about one-twelfth of the area for wood and one-eighteenth the area for coal.

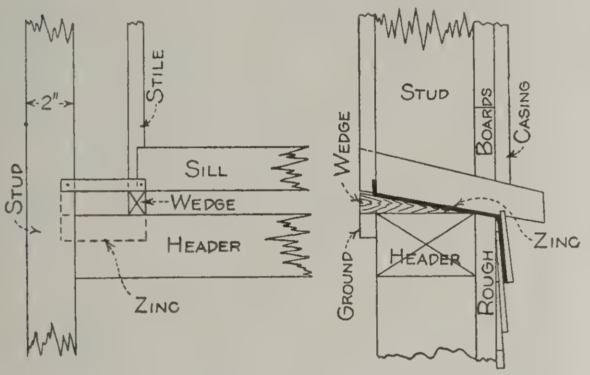
Not a few mistakes are made in the following manner: The plans call for an 8-in. flue and show a square flue lining. Perhaps there is no square flue lining handy or for some other reason, so an 8-in. round flue lining is put in the place of an 8 x 8-in. one. The round flue gives an area of 50½ sq. in., while the other one gives an area of 64 sq. in., so you see there is a difference of 13½ sq. in. in the area. No doubt there would be trouble with the draft, for I have seen that done myself, else I should hardly believe it.

There are altogether too many boys who learn the practical (?) side of their trade and scoff at books, theory, geometry, etc., and do not know the difference between an 8-in. round and an 8-in. square pipe. It is always best to follow the plans to the very letter unless you speak to the architect before changing the least thing.

Making Window Frames Water Tight

From J. M. C., York, Pa.—In reply to the inquiry of "W. H. C.," Sanborn, N. Y., in the August issue of *The Building Age* I would state that there are many ways to prevent the entrance of air and water at the sill of double hung windows, but experience has demonstrated that the best method is to use an all-metal weather strip of a standard make. It is invisible and yet permits the windows to move freely and noiselessly. The writer has known cases where the carpenters, in order to render the frames water tight, made the stops to fit so snug that the windows could not be raised. Of course this is a serious objection, and therefore weather strip is much preferred.

From J. C. B., Malden, Mass.—Replying to the inquiry of "W. H. C.," which appeared in the August issue of the paper, I would say that it is a very simple thing to put in wooden window frames in frame buildings so that there will be no leaks under the aprons. The accompanying sketch will make my method clear.



Making Window Frames Water Tight

It is simply a piece of zinc about 6 in. wide by 8 in. or 9 in. long set in at either side of the window and directly under the space for the weights. It is let into the stud about ½ an inch on one side by a sloping saw cut and pushed up securely under the sill by means of a wedge, as shown in the sketches, one of which represents a view from the inside of the room and the other represents a vertical cross section through the window sill and outside wall of the building. The zinc is turned up on the inside from ½ in. to 1 in., and is nailed to the stud and sill. It is turned down on the outside and over the top of the clapboards.

It would be better, perhaps, if the wedge extended over to the stud all the way under the zinc, so that the latter would not be punctured by the drop of the sash weights in case the cord should break. If these wedges are carefully put in and the placing of both takes only a few minutes, the correspondent will not be bothered with any further leakage.

From D. P. B., Redford, N. Y.—The problem presented by "W. H. C.," Sanborn, N. Y., is difficult to discuss at a distance. I should want to be at that window during one of the phenomenal storms which he describes to see just how much of that water pure hyperbole let in. Some good may be done with oakum dipped in paint the color of the frame, and worked in with a putty knife. I have occasionally found considerable water to come in at the top of the window frame—run in at the head and down the jambs. A close observation during a storm ought to discover the trouble.

Laying a Cement Roof

From Contractor, Clinton Co., N. Y.—If I had to do the job outlined by "A. P.," of Elgin, Iowa, in the September issue, I should set up a large post in the center of the spring house; then shore up a 2 x 6-in. piece inside flush with the top, leaving it loose. Then put on the roof of tapered strips tacked to the 2 x 6-in. pieces and on top of the post, which should be as high as the roof is wanted. No pains need be taken with the joints of the tapered strips. Cover these with two thicknesses of tar paper. The roof should not be too steep, as the mortar has a tendency to slip down.

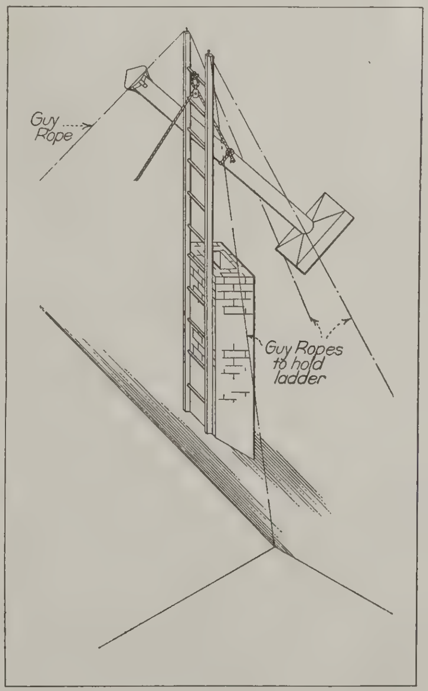
He is now ready to put on the mortar, which should be a 1:2½ mixture; that is, one part cement to 2½ of sand. This should be put on about 1 in. thick and very rough, and should be allowed to stand over night. Next morning put on wire mesh locked on the hips and cover this with 2 in. of mortar consisting of one part cement to two parts sand.

It will pay to put into the cement 10 per cent. of lime paste and 8 to 10 per cent. of Maltha. After the second coat begins to harden it should be troweled very smooth. The mortar must not be too plastic, else it cannot be kept on. The work should be done in cloudy weather.

If Maltha is used it should not be disturbed for at least 10 days. The post may then be let down, the shoring taken out and the false work will follow and may be easily removed, as well as any paper that may stick. If the work is properly done it will be very smooth on the under side. I roofed a cistern once in the manner just described and it still endures, though I put a manhole in the top. I used neither wire mesh nor Maltha.

Raising a Flue Top Into Place

From P. B., Montpelier, Vt.—In answer to "A. R. E." in a recent issue of the paper about raising a flue top to be placed on a tall chimney on a church with a steep roof, I would say that it can be


Guy Rope
Guy Ropes to hold ladder

Raising a Flue Top into Place

done without the aid of a scaffold in the following manner: Put the lower end of a ladder on the roof of the church behind the flue on the high side, having a board beneath the feet of the ladder if necessary to keep the ladder from making a hole in the valley or chimney flashing. Tie the ladder securely to the chimney with a rope. Fasten a pulley to the top of the ladder as shown in the illustration and run a rope through the pulley, tying one end to the flue top, a little above the center of balance. Now connect four guy ropes to the top of the end of ladder and secure these ropes so as to make the ladder rigid and safe and to take the strain off of the chimney. Then the flue top can be pulled up from the ground and a man can go up the ladder and set it in place. Then he can fasten the guy wires attached to the chimney top so that their lower ends can be secured at convenient places. The ladder may then be removed and the job is done. Care should be taken to make the flue top large enough to slip on to the brick chimney without any difficulty, as it will not be an easy matter to adjust it or work with it from the ladder at such a hight. Care should also be taken to avoid any accident and the work will be found much easier if a quiet day is selected.

Merritt's "Hold All" Tool Chest

From W. C. Merritt, Washingtonville, N. Y.—In view of the discussion which has recently appeared in the Correspondence Department of *The Building Age*, it may not be without interest to some of the readers if I describe a tool chest which I have found to give entire satisfaction for the purpose. The sketches so clearly indicate the construction and arrangement that very little comment would seem to be necessary.

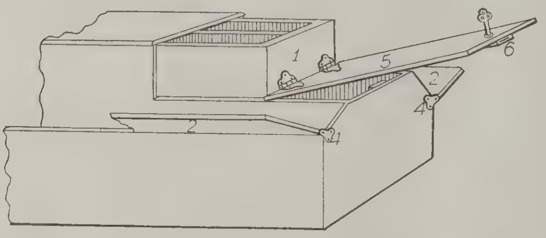


Fig 1—View Showing Sliding Cover Drawn Forward

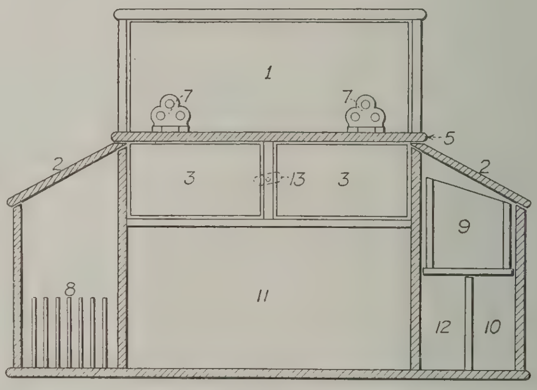


Fig. 3—Vertical Cross-Section of Chest

Merritt's "Hold All" Tool Chest—Sketches Submitted by W. C. Merritt, Washingtonville, N. Y.

I would say, however, that the chest will hold all the tools the average carpenter requires, while its light weight, convenience in getting at the tools and one lock securing all the compartments, renders it especially convenient and desirable. Fig. 1 represents a partial view showing the sliding cover drawn forward while Fig. 2 gives a general view of the chest with the tills open. Referring to Fig. 3, and bearing in mind that the same figures refer to similar parts, 1 is the sliding drawer; 2-2 are the side covers; 3-3 are drawers; 7-7 are hinges; 5 the sliding cover; 6, shown in Fig. 1, is the lock; 8 are saw racks; 9 a long till; 10 space for spirit level; 11 and 12 spaces for tools and 13 is the turn button for holding the drawers shut.

The large drawer to which the top lid or cover is securely hinged is 13 x 16 in. in size and 4 in. deep. It is opened by simply pulling forward the hinged cover. The chest is built with two side tills the inside measurements being 2¾ in. wide by 32 in. long by 8 in. deep. All tills open independently of each other and are both provided with covers that are fastened when the main cover is locked.

One side till is for holding six saws, while the other affords space for a spirit level, hack saws, compass saws, two long tills for rules and light tools, also space for two steel squares, these being put in through the drop side lid. The interior of the chest gives ample room for a set of four bench planes; a Stanley combination tool No. 45; bit braces; try squares; hammers, etc., etc. Directly under the top or sliding drawer are two small drawers each 2 x 5 in. in cross section and 16 in. in length, these being held in position by a turn button as shown on the sectional view, Fig. 3.

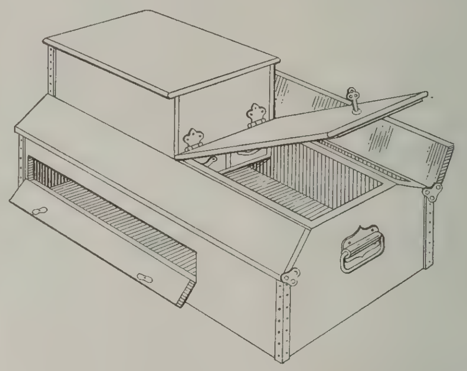


Fig. 2—General View of Tool Chest with Tills Open

The chest is built of ½-in. material, the corners being brass bound, rendering it strong to stand rough usage. It is of a shape and size to make it convenient for shipment from one place to another.

Wall Flashing For a Slate Roof

From Roofer, Syracuse, N. Y.—Allow me to comment on the two ways of flashing slate roof abutting a wall as outlined by a correspondent some time ago. The cap flashing in either case is the same and requires no mention here. The author lays some stress on the fact that it can be done before the slating is started and that it can be put on in 8-ft. lengths instead of the much shorter metal shingles, but unfortunately all walls are not as straight as those in the drawings shown. I have seen many walls so bowed that I doubt if a 4-ft. length could be placed against it, whereas with a small shingle, it is no trouble to follow a crooked wall. In regard to width of metal shingles, while the author cuts his 8-in., I have found 5-in. ample, 2½-in. up the wall and the same under the slate.

It seems to me it would be more work to connect that channel, as I call it, to the gutter, than it would with metal shingles. As regards the time required, I think that a man would nail on 8 ft. of metal shingles as he slates up about as quickly as he could put on an 8-ft. piece. It is a very simple operation.

I now wish to state my principal objection to the method as shown in drawing No. 2. If that channel should be filled up, even at one point, and it should be raining or thawing above that point, I fear there would be trouble in Central and Northern New York, where 20 in. of snow on the level and zero weather for weeks at a time is not unusual for three months of the year. I will assure anyone that if he were to try that way in this latitude, he would be taking some risk. Roofers know that snow often banks against a wall and that the heat of the house causes it to thaw close to the roof even in zero weather. Some of that water will find its way into that channel and run down until it gets to a point over the wall away from the influence of the heat. It will freeze there and form a most effectual dam, and until that dam is opened you will have a fine leak so long as there is water or snow above it.

I understand that the climate of England, where this idea originated, is much milder than the one I live in, and no doubt there this method works successfully, but the elements of risk and danger seem so great that no matter what the climatic conditions might be I would go very slow in leaving a method which I consider one of the best tricks in the trade.

Proper Fall of Skew Back for Brick Arch

From D. P. Barry, Redford, N. Y.—Regarding the troubles of "W. M. W.," of Lancaster, Pa., as to the proper fall of skew back for a brick arch I would say that he is in a gloomy wood astray—gone from the path direct. His problem is not settled by opinions or empirical rules. It does not matter how he obtains the radius, for once obtained the rest follows.

Working out his "1½ times the span" radius gives a rise of arch of 3.088+. Fig. 1 shows how the fall of the skew back must be obtained. It coincides with a radius or is perpendicular to a tangent at that point or to the center of the arch ring. The diagram also gives the difference in fall of skew backs for the different radii.

In Fig. 2 is shown the form of a granite ring for a brick arch and all the terms of the arch. One arch is just as safe as another, for if the backing endures, then the arch will endure up to the crushing point of the material.

Fig. 3 shows a form of arch with horizontal layers built by the American Indians or those that went before them and has endured from the prehistoric misty past down through the ages to the present day.

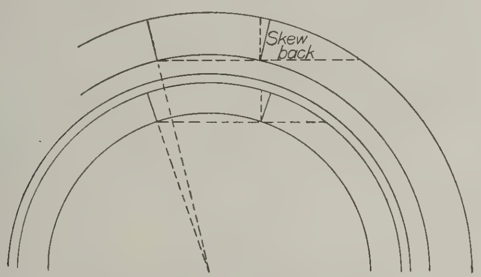


Fig. 1—Showing How Fall of Skewback May Be Obtained

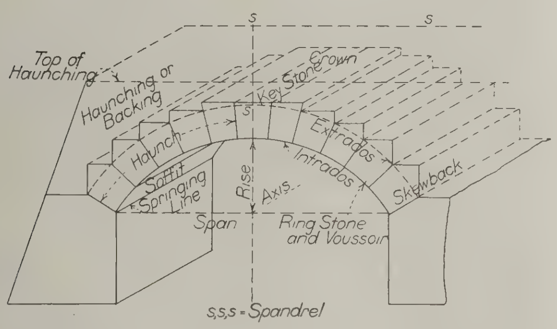


Fig. 2—Form of Granite Ring for a Brick Arch

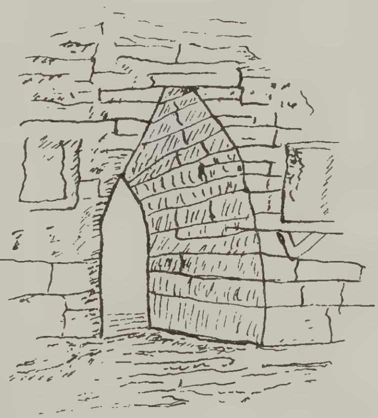


Fig. 3—Ancient Arch with Horizontal Courses

Proper Fall of Skewback for Brick Arch—Sketches Accompanying Comments of D. P. Barry

Flat arches of concrete are built to-day and flat brick arches are seen everywhere.

If the difference between the radii and skew backs does not seem right let him work them out by proportion. If there is anything wrong he will find it. Arches as small as those with which he is dealing are not considered in engineering. All this refers to circular arches. Transformed catenary, parabola and ellipse are different.

The Chestnut Street Bridge in Philadelphia—brick in cement—has a span of 60 ft. and a rise of 18 ft. The Elbert Street Bridge—brick in lime mortar—has a span of 50 ft. and a rise of 7 ft.

The joint of rupture in arches is about an angle of 45 degrees. If the load is such that one part cannot crowd another up, the arch must hold. If too evenly loaded it may fail in various ways.

What Causes Cracks in Wired Glass?

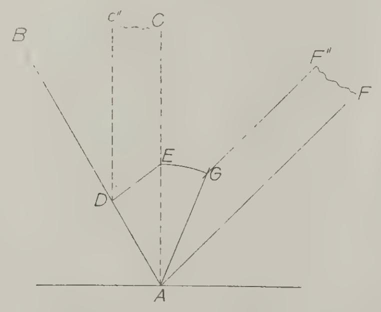
From Hollow Metal Window, Brooklyn, N. Y.—In answer to the inquiry regarding the cause of cracks in wire glass which appeared in a recent issue, may I say that I thought the cause was removed by the manufacturers some years ago and at the present time it seldom occurred, or at least, so seldom as to be unworthy of notice, since with all glass or glassware a certain amount of breakage is to be expected.

At the time wire glass was first marketed the checking of the glass was a most exasperating trial of the installers of constructions in which wire glass was used and the flood of complaints forced the manufacturers to seek the cause and apply the remedy. If I remember rightly, they said it was due to the unequal expansion, or contraction, of the wire and the glass, one pulling against the other, so to speak, with the result that a check would appear which in time would travel clear across the sheet of glass, making a true crack or cut from surface to surface. It was my impression, however, that the process of manufacture had been perfected so as to eliminate the cause or causes of checking, for of late years I have had no trouble with the hundreds of sheets I have handled.

The correspondent has a lot of glass which perhaps was not properly tempered in manufacture. The tempering is effected by allowing the glass to cool so slowly in a suitable oven or furnace that the contraction due to cooling is perfectly even and thus no strain is undergone to produce a rupture. The best way to get authentic information would be to write to some manufacturer. I do not see anything to do but to remove the checked glass, replacing it with sound glass and charge the loss to the concern from which it was bought, providing there is in the purchase agreement something to protect the buyer if the glass has already been set in place.

Drafting with the Steel Square

From W. X. Y. Z., Westfield, Mass.—I wish to thank "C. G.," of Ithaca, N. Y., for his suggestions in answer to my inquiry under the above heading in the April issue of *The Building Age*. It was a practical method of making a drawing by the use of the steel square that was called for and not the working out of a geometrical problem which is generally considered to be beyond the grasp of the average carpenter.



Drafting With the Steel Square

The accompanying diagram shows a method which the writer has used on several combinations of pitches of roof with entire satisfaction. The line *A-B* represents the pitch of the main roof and *A-C* the face of the gable rafter when in position. Lay off the thickness of the rafter as *C-c″*, and from the intersection of *c″* with *A-B* as at *D* draw a line perpendicular to *A-B*, cutting *A-C* at *E*.

Now *A-F* is the pitch of the gable rafter. Lay off the thickness of the rafter as *F-F″*, and with *A* as center and *A-E* as radius, describe an arc cutting *F″* at *G*. Then the line *A-G* is the cheek cut of the gable rafter.

Gelatine Molds for Plaster Casts

From S. Whitcomb, Dayton, Ohio.—Will you kindly give me through the Correspondence columns of the paper the formula for a gelatine composition as used to mold casts of plaster.

Answer.—According to the "Scientific American Cyclopedia of Formulas" a good gelatine mold may be made in the following manner: "Soak the best white glue in cold water for 24 hours. Then drain off ll the water. Melt the soaked glue in a waterjacket kettle. Then pour the glue upon the object, the latter being incased in a lead or pasteboard box. Let it cool for 12 hours. Then separate the cast from the object. If the object be a statuette a thread should be attached to the back and extended out of the mold at both ends so that it may be used for cutting open the mold after it is cooled to permit of taking out the statuette.

"A good material for a mold is made in the following manner: Dissolve 20 parts of fine gelatine in 100 parts of hot water and add one-half part of tannin and the same amount of rock candy. It is stated that a mold made of gelatine or glue alone may be rendered more durable by pouring over it a solution of bichromate of potash in water; one part of bichromate to ten parts of water, and afterward exposing it to sunlight.

"Most objects require oiling slightly before being covered with glue or gelatine."

Setting Out Wreath for Quarter Landing

From A. H., South Africa.—I desire through the columns of the paper to thank Morris Williams for his explanation of the problem which was presented from me under the above heading in the June issue. I quite understand that the steps in the sketch which I sent are in their wrong places and I agree with Morris Williams in condemning the arrangement.

It just shows one, however, how little some architects know about stairs or rather the planning of stairs so as to give the best effect on the hand rail. Seeing that these things are so is one drawback on most of the standard works on hand railing. They tell how a plan of stairs ought to be, but the authors apparently never think of discussing plans which are improperly arranged and how best to get over the difficulties. I firmly believe that there will be found more wrong plans than right ones, at least that seems to be the case here.

Treating Moisture from Plastered Walls

From Builder, Redford, N. Y.—I thought about every possible difficulty had been ventilated in the Correspondence Department, but the problem of "F. McK.," St. Louis, Mo., is altogether new. Alabastine might be tried as an experiment. Spar varnish will be effective, though somewhat expensive. Shellac will also do the work, and paint mixed in boiled oil will give satisfactory results. All these except Alabastine must be put on when the walls of the room are dry.

Hints on Lighting a Model Home

The Use of Globes and Reflectors—How to Arrange the Illumination for the Various Rooms

THE lighting of the model home must be free from glare and the color of the light must be right. Under no condition should one's eyes be exposed to glaring, unmodified lights, since eyestrain, which will lead to chronic headaches, insomnia, hysteria or indigestion, may result, says F. Laurent Godinez in a recent issue of *Good Housekeeping*. From the esthetic viewpoint, interior decoration to be appreciated must be seen, and an interior which is so glaringly lighted as to be annoying to one's sight can never be termed artistic. Over-brilliant lighting is opposed to refined taste, and a room so lighted is not fit to live in.

The white-light quality which is characteristic of modern illuminants is absolutely opposed to the *motif* of repose which should be the predominant theme in the home atmosphere. This obnoxious "white light" is uncomplimentary alike to individuals and their surroundings. It reveals every wrinkle, emphasizes each facial blemish, and makes one's features appear old, pallid, and unrelaxed. An amber light, on the contrary, is warm, soft and inviting. It is restful to the eye, like the oil lamp, and creates an atmosphere of repose. Everything is mellowed and beautified by it.

Kind of Globes to Use

It is not difficult to modify this unpleasant white-light effect. It can be accomplished gracefully by enclosing the offending illuminants within amber shades of glass, silk or paper. These can be obtained to conform with any decorative treatment. Lighting globes of "ground" or "etched" glass are undesirable; their good effect by day is marred by their spotty, glaring appearance at night.

Globes should be chosen which entirely conceal the glaring light within, and should always be observed *lighted* and *unlighted*. When the glass is too thin, or "etched," or "ground," the exterior design, which may be attractive when unlighted, becomes obliterated by the glare when lighted. When it is not feasible to change globes of white glass, the desired color change can be effected, in the case of gas, by substituting amber-light for white-light Welsbach mantles. With Mazda-Tungsten electric lamps, home-made cylinders of amber gelatine film, paper, or shirred silk can be placed over the electric bulb *within* the white globe. Increasing the thickness of these enveloping cylinders by extra layers of the material used gives the requisite depth of amber light, which can be determined by comparison with the oil-lamp as a standard.

The invention of reflectors formed by plating a corrugated glass shell with pure metallic silver has made possible what is known as indirect lighting. In this way lights placed within silver-plated reflectors direct every useful ray of light upward, where the diffusive action of the ceiling illuminates the interior with entire freedom from glare. Indirect lighting is just as cheap as direct to maintain, and is much cheaper to install, since the necessity for individual lights over desks, tables, sewing-machines, sinks, and all isolated working surfaces that require localized light is obviated by a perfect general illumination. Therefore the placement of one indirect-lighting source in an interior gratifies every conceivable localized requirement and saves the expense of time, labor, and material in conducting wires to remote points, not to mention the cost of the numerous special lighting fixtures required. Again, in placing individual fixed lights, under the assumption that the arrangement will be permanently satisfactory, one is apt to overlook conditions which ultimately necessitate rearrangement of furniture, and extra expense for additional lights. It is possible to cut estimates of installation costs at least seventy-five per cent. by carefully analyzing the requirements of local and general illumination.

Enhancing the Pictorial Effects

Many persons prefer to "see" a source of light, rather than an opaque fixture, within which indirect-lighting equipment is often placed. The whole pictorial effect of a room may be enhanced or destroyed by its mode of lighting. Globes, or shades, which have become commonplace through vulgar usage, like the ribbed affairs of clear glass typical of commercial lighting, should never defile the atmosphere of the home. Every one should try to make his lighting as distinctive as possible, and it is just as lacking in good taste to tolerate commonplace lighting appliances in the home as to duplicate your neighbor's furniture, carpets, and interior decoration. One's desire for a visible light may be satisfied by utilizing the glassmakers' bowls and urns in combination with indirect-lighting equipment.

Dead-light ceilings should never be used with indirect lighting, unless strictly essential to the decorative plan. In such cases the white light can be changed by placing screens of amber-colored gelatine film over the reflectors. Ceiling finishes should always be mat-surface, or depolished. Polished surfaces reflect glare and produce eye-strain.

Considering the Lighting of a Model Home

Now, referring to the plan of the model home, let us go through the house together, applying some of our lighting technique. Starting with the porch, direct or indirect lighting is applicable with either gas or electricity. If indirect lighting is preferred, the fixture can be home-made, consisting of a rustic hanging basket, with a center space to accommodate the indirect reflector and lamp; or an inexpensive terra-cotta urn can be placed on a pedestal, just high enough to prevent one from detecting the *modus operandi.* The control for the porch light should be from inside and out. If gas is used, this can be accomplished by a pneumatic valve connected by a fine hairlike copper tube, which, while hollow, is thinner than an electric wire. The outside switch should be concealed (behind a hinged push-button plate, is a good way), a precaution which facilitates the location of obscure key-holes.

General and Local Lighting for Living Room

The living-room should have both general and local lighting. The local lighting is best rendered by portable gas or electric lamps, which are obtainable in designs of infinite variety. Floor outlets should be provided, also baseboard outlets for fans, etc. There is available a new gas-outlet which permits the attachment of a flexible armored tube connecting with a gas-iron, fan, chafing-dish, coffee-percolator, or portable reading-lamp, and when the tube is disconnected the gas cannot be turned on.

The control for all the lamps (some will presumably be used for decorative purposes) can be local or remote, thereby enabling one to change the effect from local to general lighting from one wall switch, which should be located at a convenient point. This, interpreted literally, with reference to egress or ingress, signifies three separate control switches. One at the front door, one at the hall door, and one at the head of the stairs would be the ideal arrangement, and if indirect lighting as a source of general illumination be used, the saving effected by not purchasing an expensive ceiling fixture would leave a surplus over the installation cost of the three-switch remote control. If a book-case or a piano is placed in this room, one indirect-lighting reflector, within an urn, with upright Welsbach mantles or one large Mazda lamp, will save fixture expense.

Advantages of the Portable Lamp

A portable lamp may be had which gives both the indirect and local effect, a silver-plated reflector being concealed within the exterior silk shade, supplemented by small lamps on a separate pull switch. The advantage of this lamp is that it meets both general and local requirements, and reduces wiring expense by operating from one floor outlet.

Unless ceilings are high, hanging lighting fixtures have a tendency to make a room seem cramped and small, particularly when the living-room and the dining-room are intended to be thrown into one, as in this instance. Unless one desires to spend a considerable amount for something quite different in the line of hanging fixtures, the procedure outlined is the best.

Where two rooms are to be combined for social functions, a hanging dome will interfere. Table candelabra afford charming lighting and can be made feasible by placing outlets beneath the dining-table. One central hole in the cloth (concealed at other times by a doilie or fern-dish) permits the attachment of gas or electric candelabra, the soft glow of the little candle shades being in agreeable contrast to a glaring lamp which may be so placed as to project noticeably below an "art" glass dome.

The candles can be supplemented by side-wall lights, if desired, but the side wall must be regarded as a desirable *locale* for other than lighting which is purely functional in the decorative sense. When the brightness of the side-wall light becomes offensively predominant, its pictorial value as a decorative symbol is destroyed. If general lighting is required for certain occasions, it can be supplied (indirectly) by one or two lights concealed in cornices, or behind buffets or china-closets. The control should be located conveniently near the door, and care should be taken to avoid the offensive brass plates, which deface a wall. These should be countersunk, and the paper placed over them, or painted to match the wall. They are not decorative symbols, and should, therefore, be subordinated.

Lighting of the "Den"

Assuming that there is to be a table in the den, individual lamps for it and the desk, in combination with a general system as described for the living-room, would be appropriate. It is certain that the portable lamps will not adequately illuminate the bookcases for reference and selection of volumes. The control should be located near the hall door.

If direct lighting is used in the bath room, wall brackets should be used. These should be placed on each side of the mirror and have pendent globes of opal glass on a level with the features of a person six feet tall. With indirect lighting, one wall bracket above the mirror will suffice. Control may be with pull chains or a wall switch, as preferred.

With direct lighting, separate fixtures will be needed over sinks and ranges, supplemented by a center ceiling fixture with opal glassware. With indirect lighting, one pendent center fixture will meet all local requirements, if the woodwork and side walls are not too dark in color. Several baseboard outlets should be supplied for gas or electrically operated domestic mechanisms.

Lighting for the Bed Rooms

The bedrooms require local and general lighting. Portable lamps attached to baseboard outlets should be arranged by bedsides on somnoes or telephone tables. Baseboard outlets for dressing table lamps should be provided. Indirect illumination renders the expense of interior closet lights, with their unreliable "automatic" switches, unnecessary, also providing an excellent light for viewing one's self in mirrors on bureaus and in pier or cheval glasses. When twin beds are placed slightly separated, the tendency is to put a portable lamp between them. Sometimes this is less convenient than a separate lamp beside each bed.

The Stairs and the Hall

One small light (a 25-watt Mazda electric or a Welsbach Junior gas-mantle) on a wall bracket, in a reflector directed against the ceiling at the head of the stairs, will light the stairs and hall at a negligible expense, even if burned all night. A similar wall bracket on the side wall, facing the large closet adjoining the den on the ground floor, will insure safety and convenience at night. Duplex control from above and below can be economically installed.

Bonds and Mortars in Brick Walls*

Structural Uses of Mortar—Artistic Effects—Kinds of Mortar Joints—Methods of Using Colored Mortar

ONE of the most essential elements in brickwork is the mortar in which the bricks are laid Upon examination of the definition of bond given above, we can see how it might be possible under the most favorable conditions to erect a wall without the use of mortar. In fact, the Greeks in their masonry construction did so erect their marble walls by rubbing the blocks together, after applying sand and water to the joint, until the desired planes were obtained. Thus laid the large blocks of marble, which were of sufficient size and stability to retain their positions in the wall by gravity, made a perfect wall. With our small clay unit of brick, however, there is not sufficient weight to a unit to permit the Greek procedure. Hence mortar is used, and it fulfills the double function of providing for each individual brick a bed in which the irregularities of surface are overcome and, what is still more important, of surrounding each brick with a bonding material which eventually produces a monolithic structure.

Mortar discharges two functions—the one structural, having to do with the nature and composition of the mortar as a bonding material; the other ornamental, affecting the appearance of the joint on the face of the wall, produced by its form, color and texture.

Structural Uses of Mortar

Viewing the matter from a structural standpoint, it is of fundamental importance to use a thoroughly sound, well tempered and well mixed mortar, neither too stiff nor too plastic. The proportions of the ingredients should be kept strictly uniform throughout any given job. The building ordinances of every large city dictate the legal composition of mortar to be used in that city.

Generally speaking, mortar is composed of cement and sand, or lime and sand, or cement mortar and lime mortar, mixed in various proportions. But to secure certain desired results, the sand may be partly or entirely replaced by other materials. Thus for a wide joint fine gravel—not over one-fourth inch in diameter—ground granite, or crushed brick is used wholly or in part for the sand. For a white joint, coarsely ground white marble or limestone may be substituted; or for fine joints, which are meant to be very white, pulverized white marble is frequently used.

In any case the material must be of the very best. The cement should pass the proper and usual tests as set forth by the American Society for Testing Materials; the lime should always be fresh and well burned, and of a character which will slake into a smooth and even consistency, without lumps of hard or underburned material; and the sand should be free from loam, pieces of charcoal, iron oxide, or other material of like character.

Use of Cement Mortar

A great many architects will not permit the use of anything but a purely cement mortar. A number of city ordinances also require that the mortar used shall not be inferior to a mortar composed of one part of Portland cement and three parts of clean sand, thoroughly mixed dry, so as to be of one uniform color, with the proper amount of water added to make a smooth working composition; and shall be used while fresh. Some engineering authorities, however, will permit of as large a proportion as four of sand to one of cement.

The usual practice, especially in the Middle West, is the use of a mixture of lime mortar and cement mortar. A specification for this character of mortar would be as follows—or in similar proportions: "The lime mortar shall be composed of five bushels of fresh burned lime to one cubic yard of sharp river sand; this mortar to be made up so as to have two weeks' supply ahead of the work—no lime mortar that is not at least two weeks old to be used. The cement mortar is to be composed of one part of American Portland cement (showing a tensile strength of 500 pounds per square inch on seven days' exposure) and three parts of clean sand; the cement mortar to be mixed fresh each day just before being used and in such quantities that none shall be left over at the end of the day's work. Take of the above mortars equal parts, thoroughly mix and use fresh, not allowing the mortar to set before using in the walls." Thus mixed, these mortars when set become a pale gray color, of either a greenish or bluish tint, depending upon the brand of cement used. The effect of lime mortar in the mixture is to produce a much lighter color in the finished joint than is obtained by the use of a pure cement mortar.

Artistic Effects

But being primarily interested in the artistic aspects of brickwork, it is fitting that the form, texture and color of the joint as it appears on the face of the wall should here be emphasized. The form and color of the mortar joint become an added factor in the development of artistic brickwork and should be used with understanding and skill, since as usually estimated, the surface of the mortar ranges from one-seventh to one-fourth of the whole surface of the completed wall. The entire color scheme of the wall may be changed either by the manner of treating the mortar joint or by the introduction of color into the mortar. Thus the flush joint, that is, the cutting of the mortar flush with the face of the brick, results in a decided line of color, which may be large or small, according to the size or width of the joint. Or, to take another example, with the sunk or cut joint, which practically eliminates the color of the mortar altogether, we get a shadow line around each brick.

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*Continued from page 59 of the September issue.

The study of color in the mortar joint will often enable the designer to bring his entire wall surface into the harmony of color he is striving for. On the other hand, piers and openings may be featured, and architraves and quoins may be produced around an opening or at the angles of the building, by the simple expedient of using a flush joint at these places and a sunk point on the intermediate surfaces, or the reverse.

Bond pattern in brickwork may be entirely lost by the use of a mortar joint ill-chosen in form or size, while beautiful texture and beautiful pattern may be accentuated through the mere treatment of the joint alone. Or pattern may be brought out in a brick wall of uniform color by the way in which the border joints, enclosing the pattern units, are handled.

Texture in the joint, that is, the surface of the mortar as it appears to the eye, should harmonize with the texture of the brick. Thus a rough-textured brick is shown to the best advantage by a rough joint. A rough joint, however, it must be observed, does not mean an *unworkmanlike* joint. All joints, rough or smooth, should be workmanlike in that they meet the edges of the brick in a clean, sharp manner.

A rough or granulated surface in the joint is obtained by the use of very coarse sand or fine gravel, the face of the joint being either cut with the trowel or scraped with a jointing stick so as to roughen the surface of the mortar. A smooth joint is obtained by the use of a steel jointing tool, or by pressure applied to the toe of the pointing trowel. Large joints should usually be rough surface joints, and, as already indicated, are used to best advantage with rough-textured brick, although beautiful effects may be obtained by using this joint with a smoother or fine-textured brick. Some of the most famous brick designers in this country, however, are of the opinion that all rough-textured brick should have a raked joint, that is, a joint cut back from the face of the brick, often very deeply, "leaving the brick surface thus free to expose its color and texture, and the individual brick to play its part and place as a unit therein."

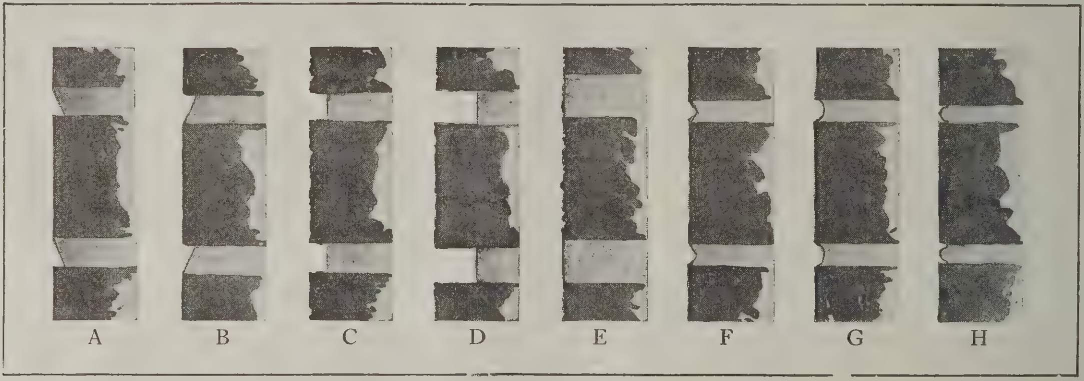
The usual mortar joints in good brickwork are indicated in the accompanying cross-section sketches and photographic reproductions presented in Figs. 17 to 25, inclusive. Joints A and B are trowel-struck joints, and are usually made by the bricklayer as the work progresses, being the common jointing in ordinary brickwork. As American mechanics usually work from the inside of the wall, joint A is the easier joint to strike, while joint B, the so-called weathered joint, requires more care, as the trowel has to be worked from below. But this form of joint is the better able to shed the water and is the more permanent joint of the two.

Joint C is a raked joint, made by removing the surface of the mortar, while it is still soft, with a convenient tool. Joint D shows a set-back, or stripped, joint which is made by laying wooden strips on the top of each course and filling up with mortar behind these strips, bedding the brick on top of the strip which is removed when the mortar is sufficiently hard to sustain the weight of the brick. While the joint stripping adds considerably to the expense, it accomplishes the result of having the bottom edge of the brick on a level line, prevents the smearing of the face with mortar during the course of erection, and generally tends to equalize the horizontal joint. Both the raked and the set-back joint have a tendency to darken the appearance of the wall, owing to the deep shadow which the joint makes on the surface. These joints are very effective and bring out with great distinctness any pattern with which they may be used.

Joint E is a rough-cut flush joint, which is made by cutting off with the trowel the surface mortar projecting beyond the face of the brick. The exposed surface of the mortar must be left just as it is after the excess mortar is cut off, as any repointing or patching of the joint is not only very apparent and breaks the color effect of the surface of the joint, but also is likely to be injured by the action of the elements.

Joints F, G, and H practically belong to the group of pressed brick and smooth surfaces, and are joints that are normally kept quite small. They are better suited to interior work and are formed by the use of a steel jointer which, in order to make the lines true, is drawn along a straight edge.

Terrace floors and steps, when built of brick, are usually pointed with what is called a "thumb" joint, which is a broad slightly concave joint thoroughly rubbed down with a steel jointing tool. It is good



Bonds and Mortars in Brick Walls—Fig. 17—Various Kinds of Mortar Joints

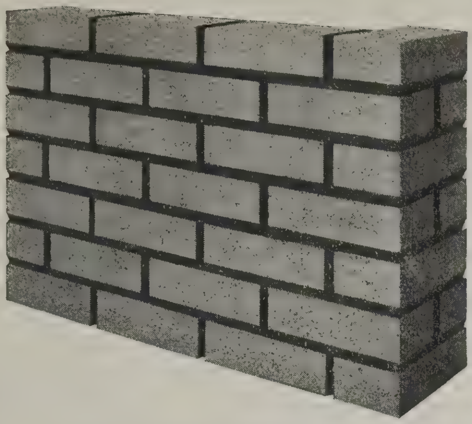


Fig. 18—Specimen of Struck Joints

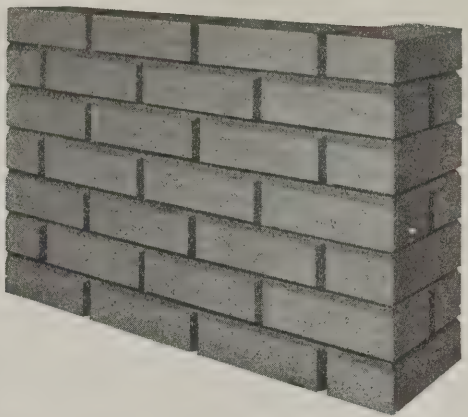


Fig. 19—Weathered Joints

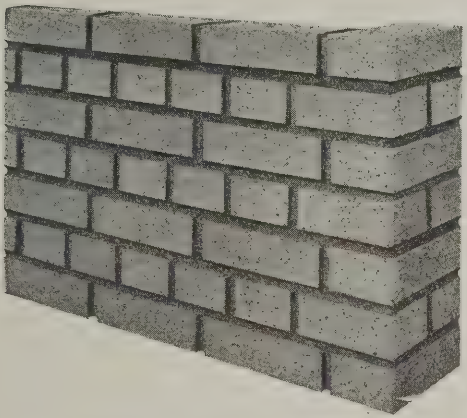


Fig. 20—Raked Joints

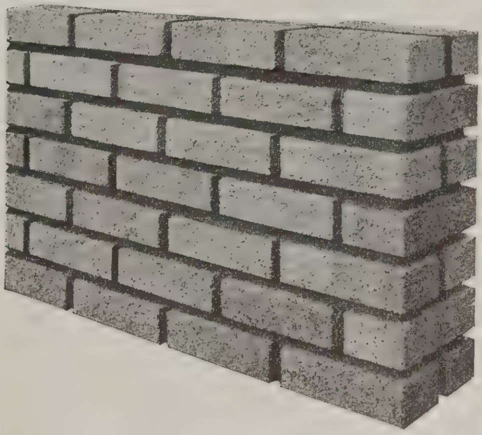


Fig. 21—Set-Back or Stripped Joints

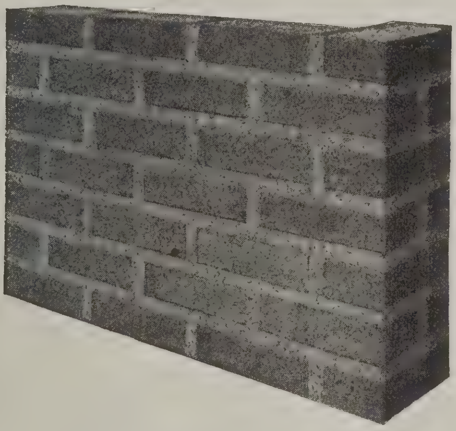


Fig. 22—Rough-Cut Flush Joints

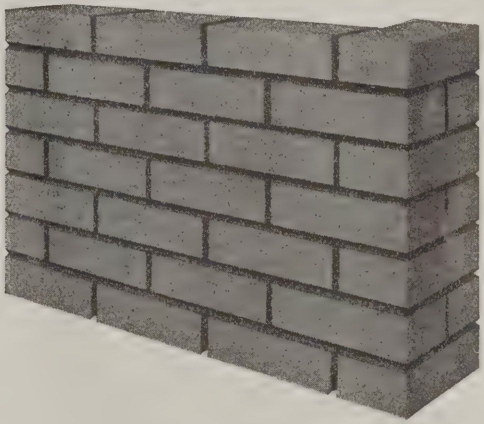


Fig. 23—V-Shaped Joints

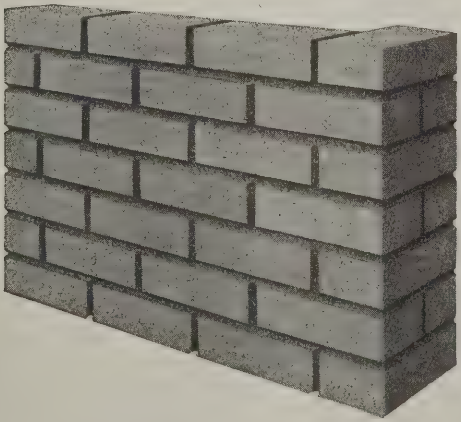


Fig. 24—Round or Rodded Joints

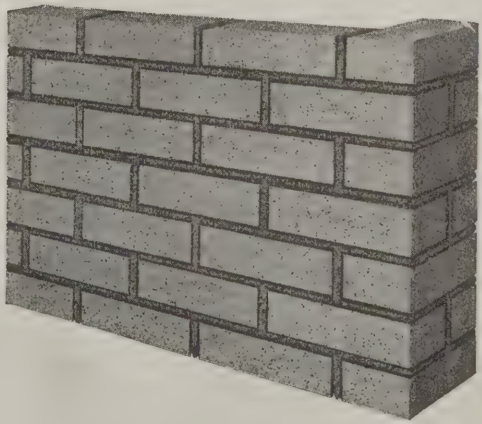


Fig. 25—An Example of Beaded Joints

Bonds and Mortars in Brick Walls—Appearance of Joints in the Finished Wall practice to have the exposed face of brick used for terrace floors and steps given a good coat of raw linseed oil immediately before laying, as this practice prevents the mortar from sticking to the face of the brick and permits of clean, clear, finished work.

Addition of Color to Mortar

The addition of color to mortar is one of the expedients that is at the command of the designer of artistic brickwork, to produce that nice degree of harmony of the total wall surface so frequently necessary for securing the essential character of his design. Colored mortar is needed to bring out the life and character of certain tones of brick and is in itself a serious study. The color required to harmonize with certain brick tones can only be found by experiment, and that experiment should always consist of laying a section of sample wall in the colored mortar joint as proposed, large enough to permit a judgment on the finished whole.

There are many fine artistic effects that may be secured by the use of artificially colored mortar which harmonizes with color tones and textures in the brick. Two walls laid of absolutely the same kind of brick will present an altogether different appearance if laid in different colored mortars, an effect that is enhanced if, in addition, there are used different forms of joint. In one wall use a rough-cut flush joint of dark mortar, and in the other a light mortar raked out deep, and the observer could hardly be persuaded that the same brick had been used in both walls. But mortar colors, the reader must be advised, are materials rather difficult to deal with, and the greatest care must be taken in their selection, not only to secure just the shade wanted but to avoid using those that are chemically affected by the lime or cement of the mortar. An otherwise beautiful wall may be almost ruined by a false tone of color (artificial or natural) in the joint, while, on the other hand its beauty may be greatly refined and enhanced by the employment of a harmonious color in the mortar.

Two Methods of Using Colored Mortar

There are two methods by which colored mortar may be used. The first is its use as the actual working mortar in which the wall is laid. The second is its use in tuck-pointing the wall at the completion of the job. In rough-textured joints the first method is practically necessary. Where a steel jointer may be used, tuck-pointing becomes much the best method of producing the desired result. Fortunately for the designer, it is seldom necessary to produce vivid or strong color in a rough-textured joint.

The ideal practice would be first to complete the entire wall with an inch-deep raked joint, and then, after cleaning down the work to tuck-point it in fair weather from one batch of the properly colored mortar, at one time, and in one operation. Some colors more than others, especially blacks, seem to require this care, for the daily stoppages of the work and other delays show in the bleaching of the last few joints on the top of the unfinished wall, caused by the action of the sun and the elements. But as, in view of the added expense, this is rarely done, the next best expedient is to cover the last few courses at the end of each day's work, and to secure an experienced and conscientious mixer who has the ability and inclination to use exact proportions in reproducing from day to day the uniform batches of colored mortar necessary to complete the work.

Enough has been said—and shown in the diagrams—to suggest the varied artistic possibilities in making the wall of brick an object of beauty. Bonds and mortars do not concern merely the dull prosaic mechanics of cementing bricks together and building them into a strong solid wall, but treated intelligently in connection with the textures and colors of the bricks themselves, offer the most flattering artistic opportunities. Let the designer in brickwork but know *what* his building is to be and *where* it is to be—a modest or a pretentious dwelling in town or country, a great block in the metropolis or a store in the village street, a city hall, a school of learning, or a temple of worship—and he has within his hands the fine warp and woof of bonds offering their patterns, and of mortars showing their interlacing lines of color, with which to weave the fitting garments of habitation for man.

It speaks well for our American architects that during the past twenty-five years, especially in the last decade, they have shown an intelligent appreciation of the art values in brick by erecting many beautiful buildings in that material; and it is encouraging to recognize not only that their appreciation grows from day to day, but that the owner and builder is more and more becoming aware of the beauties that lie in artistic brickwork. Partly as a cause and partly as a result of this desirable architectural condition, American brick manufacturers have, with the aid of modern invention and scientific discovery, outstripped the rest of the world in the quantity, variety and quality of their product, thus offering to the architect a building material which is the most natural, plastic, durable and beautiful for the purposes of his art.

◆

A Splendid New School Building

Four new buildings, occupying the four sides of a square, in South Manchester, Conn., are about to be erected by the Cheney Bros., as part of the development of that town. Designed by Carrere and Hastings, architects, New York, these structures include a primary school, a vocational school, a library and a club building. The primary school is to be proceeded with at once, the contractors being the Aberthaw Construction Co., Boston. It is a brick building of more than usual beauty, the cost of this one building being about $110,000.

◆

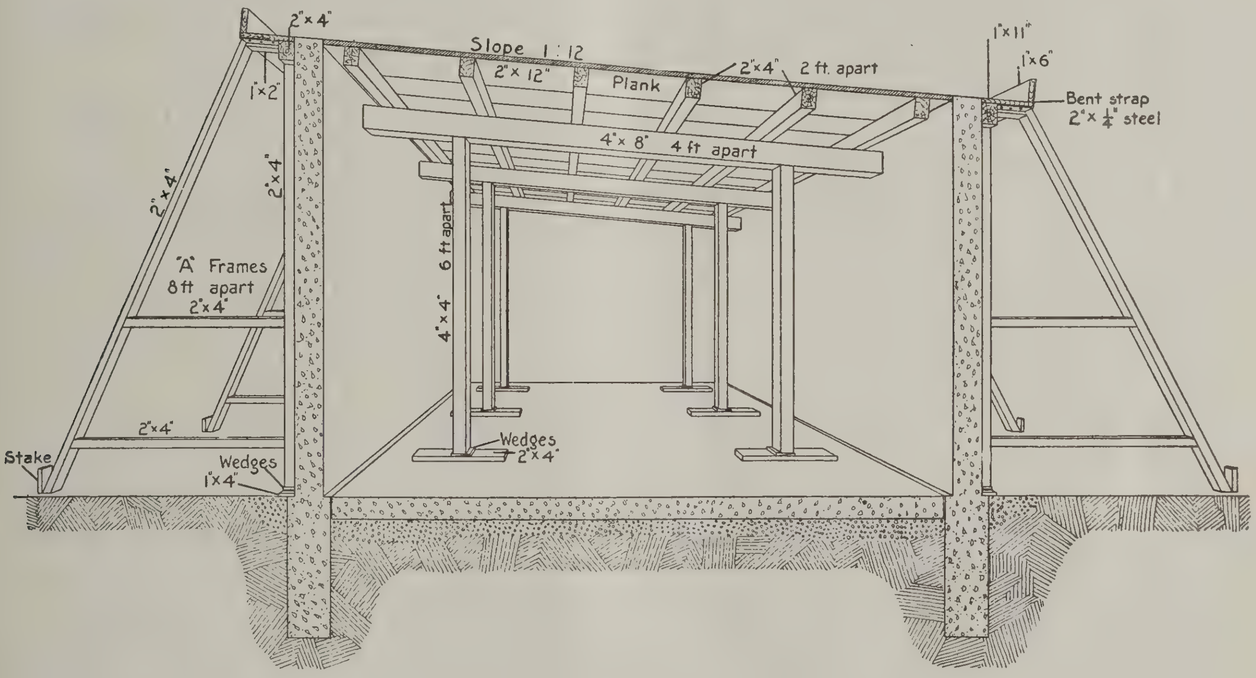
In constructing the Tallah tank at Calcutta, India, which is said to be the largest of its kind in the world American roofing material was used. The tank is 320 ft. square, 16 ft. deep and has a capacity sufficient to supply the city for eight hours. The steel construction is 106 ft. high and is erected to support a high pressure reservoir for the city. It is said that the use of American roofing over this immense tank keeps the water both clean and cool.

Merits of Reinforced Concrete Roofs

Steep Pitch Not Essential—Under Side May Be Level with Great Resulting Economy—Some Valuable Tables

By William M. Kinney*

WHERE extensive roof construction is to be undertaken, the design, slab thickness, pitch and reinforcement will necessarily be determined by an engineer or architect familiar with reinforced concrete construction. However, many cases will arise where readers of *The Building Age* will have occasion to roof small buildings, and this article is intended to supply such information as will enable a builder to employ reinforced concrete in the construction of roofs of reasonable size, in cases where the work is not of such size as to warrant the employment of an engineer or architect, and where recourse would otherwise be had to the makeshift of a temporary roofing material.



Merits of Reinforced Concrete Roofs—Fig. 1—Sectional Elevation, Showing "Forms" in Position for Concreting a Flat Slab Roof and Eaves

Even though other parts of a building are of fire-resisting construction, the roof is the most vulnerable part of the structure. Roofs are exposed to sparks and embers from without, and if made of combustible material, quickly blaze from interior fires; consequently, all buildings intended to resist fire should have fireproof roofs.

Many people have been deterred from using concrete roofs because of their supposed great cost, failing to remember that a concrete roof cannot blow away, requires no paint nor repairs and will outlast any other material ordinarily used in building construction. When these factors are considered the concrete roof will be found to be the cheapest in the long run.

Ordinary types of roofing material require a comparatively steep slope to resist driving rains. In contrast with these concrete roofs may be made comparatively flat, requiring a rise of only ¼ inch to the foot. If desired, the under side of the roof may be made level, the slope being obtained by varying the thickness of the roof slab; consequently, a great saving is effected in the amount of material, and, at the same time, the space underneath the roof is far more useful than when cut off by the sides of a sloping roof.

A suitable method of constructing forms of flat slab roofs is shown in Fig. 1. To insure a smooth ceiling the face of the form underneath the concrete should be smoothly dressed tongued and grooved lumber, although good results may be obtained with square-edged planking, provided the edges are true so that no cracks will be open between the planks. Whitewash, or a mixture composed of equal parts of boiled linseed oil and kerosene, should be applied to the surface of the lumber that is to be in contact with the concrete. While 2-inch lumber is recommended for the face of the forms, lighter material may be used if sufficiently braced. All sizes shown in Fig. 1 are readily obtainable, being stock lengths and widths. Forms may be erected without nailing or fastening except where specially directed, as shown in the illustration. In this way the lumber may be kept in condition for future use for other purposes. Under the most favorable conditions in hot weather, forms should be left in place at least ten days, and longer in cold weather. Forms should never be removed while there is any doubt about the concrete having hardened sufficiently to support the load to be imposed upon it.

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*Engineer in charge, Universal Portland Cement Co.

"Table A" shows the thickness of slab required for concrete roofs of various dimensions from 4 feet square up to 16 feet square.

Table A

Thickness of Roof Slab in Inches

Width in Feet Between Center Lines of Walls	LENGTH OF ROOF IN FEET BETWEEN CENTER LINES OF WALLS						
	4	6	8	10	12	14	16
	In.	In.	In.	In.	In.	In.	In.
4	2	2	2½	2½	2½	2½	2½
6		2¼	2½	2½	3	3	3
8			3	3½	3½	3½	4
10				3½	4	4½	4½
12					4	4½	5
14						5	5½
16							6

Load = Weight of roof + 50 pounds per square foot.

"Table B" gives the amount of cement, sand and gravel or broken stone required for roofs of various sizes and thicknesses.

Table B

Cement, Sand and Stone

Required for Concrete Slab Roofs. Proportions for concrete 1:2:3. (Each cubic yard of 1:2:3 concrete requires about 1.74 bbl. of cement, .52 cubic yards of sand and .77 cubic yards of stone.)

			WIDTH OF SLAB IN FEET (BETWEEN EAVES)						
			4	6	8	10	12	14	16
Sacks of Cement, 1 sack = 1 cu. ft.	Length of Roof in feet between eaves	4	0.7						
		6	1.0	2.0					
		8	1.7	2.6	4.2				
		10	2.2	3.3	6.1	7.6			
		12	2.6	4.7	7.3	10.4	12.5		
		14	3.0	5.5	8.5	13.7	16.4	21.2	
		16	3.5	6.2	10.1	14.4	20.8	26.7	33.3
Cu. ft. of sand	Length of Roof in feet between eaves	4	1.4						
		6	2.1	3.9					
		8	3.4	5.2	8.3				
		10	4.3	6.5	12.1	15.2			
		12	5.2	9.4	14.6	20.8	25.0		
		14	6.1	10.9	17.0	27.3	32.8	42.5	
		16	6.9	12.5	20.2	28.8	41.6	53.4	66.6
Cu. ft. of sand	Length of Roof in feet between eaves	4	2.1						
		6	3.1	5.6					
		8	5.1	7.8	12.5				
		10	6.5	9.8	18.2	22.7			
		12	7.8	14.0	21.8	31.2	37.4		
		14	9.1	16.4	25.5	41.0	49.1	63.7	
		16	10.4	18.7	30.3	43.2	62.4	80.1	99.8

Table C shows the size and the placing of the reinforcing rods required.

Table C

Spacing of Reinforcing Rods in Inches

Width in Ft. Between Center Lines of Walls	LENGTH OF ROOF IN FEET BETWEEN CENTER LINES OF WALLS							
	4	6	8	10	12	14	16	Size Steel
	In.	In.	In.	In.	In.	In.	In.	
4	12 12	9½ 24	8 36	8 36	8 36	8 36	8 36	¼ In. Rd. Rods
6		6 6	4¾ 12	4 36	4 36	4 36	4 36	
8			11 11	9½ 22	9 36	7¾ 36	7¼ 36	⅜ In. Rd. Rods
10				8¾ 8¾	7¾ 16	7 27	6½ 36	
12					6½ 6½	5¾ 12	5¼ 16	
14						5¼ 5¼	4½ 8¾	
16							4 4	

Note.—Upper figures are for cross reinforcement; lower figures for long reinforcement.

Load = Weight of Roof − 50 pounds per square foot.

Simple gable roofs for small concrete buildings should consist of a ridge beam and two side slabs of reinforced concrete, as shown in Fig. 2.

"Table D" gives the size of ridge beam and specifies required reinforcing for roofs from 8 to 16 feet in length.

Table D

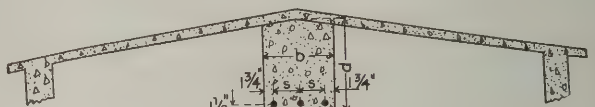
Size of Ridge Beams for Gable Roofs

Length of Roof	8 Ft.	10 Ft.	12 Ft.	14 Ft.	16 Ft.
Breadth of Beam (b)	6 In.	8 In.	9 In.	10 In.	10 In.
Number of Rods	2	3	3	4	4
Spacing of Rods	2½ In.	2¼ In.	2¾ In.	2 3/16 In.	2 3/16 In.

Width of Roof, Ft.	Depth of Beam, In.	Size Rods, In.	Depth of Beam, In.	Size Rods, In.	Depth of Beam, In.	Size Rods, In.	Depth of Beam, In.	Size Rods, In.	Depth of Beam, In.	Size Rods, In.
8	9½	½	10½	½	12	⅝	13½	⅝	16	⅝
10	10½	½	11½	½	13	⅝	15	⅝	17½	⅝
12	10½	½	12½	⅝	14	⅝	16	⅝	18½	⅝
14	10½	½	12½	⅝	15	⅝	17½	⅝	20½	⅝
16	10½	½	12½	⅝	15½	⅝	17½	⅝	22	¾

The ridge beam may be cast in place or in a mold box on the ground. The latter method insures proper curing of the beam before it is subjected to loads. If the beam is cast in position, it can be made in a simple box mold supported on the same framing erected to carry the side slabs. In this case, concrete should be placed for the beams and the slabs at the same time, casting them together as a monolith.

The proper size and spacing of reinforcing rods having been obtained from "Table C," the spacing of the rods should be marked off on the forms and then laid down and brought together at all intersections. The reinforcing should then be placed upon small blocks of wood or concrete in such manner that the rods will be imbedded about one inch from the bottom of the roof slab. The effectiveness of the reinforcing is reduced if rods are placed any higher. In reinforcing gable roofs, the rods running at right angles to the ridge should extend from eave to eave continuously, not being broken off at the ridge. This binds the two sides of the roof together as one slab.



Merits of Reinforced Concrete Roofs—Fig. 2—Cross-Section of Roof for Small Concrete Building

Concrete for roofs should be mixed in the proportion of one sack of Portland cement, 2 cu. ft. of clean, coarse sand, graded in size up to ¼ in., and 3 cu. ft. of hard, durable gravel or crushed stone, varying in size from ¼ in. up to 1 in. Aggregates both fine and coarse must be free from clay, loam or other matter which will tend to impair the strength or watertightness of the concrete. Bank-run gravel or crusher-run stone should never be used without screening and mixing in proper proportions. Wherever possible, mixing should be done by a batch mixer into which the materials are introduced in proper proportions, water added, and mixing continued by slowly revolving the drum for at least 45 seconds, or until thorough homogeneity of the concreting materials is obtained. Sufficient water should be used to form a quaky mixture, care being taken not to use so much water that the mass will flow to the lower side of the roof.

If mixing must be done by hand, it should be upon a watertight platform where the materials may be spread in layers and turned at least three times, or until of uniform color, after which water should be added and the mass again turned at least three times, or until very thoroughly mixed. A good concrete roof cannot be made from poorly mixed material. Where a comparatively flat concrete roof is to be placed on monolithic concrete walls, the walls may be brought to the proper hight and squared off in the same manner as for a roof of other material. No reinforcing rods need extend from the walls into the roof but the concrete for the roof may be laid directly on top of the walls without grouting, thus leaving a joint which allows the roof to expand and contract freely. If the roof has a pitch exceeding 2 in. to the foot, it should be joined to the walls by extending the vertical reinforcing a foot above the top of the wall, and the top surface of the wall should in that case be left rough, drenched with water, and painted with grout immediately before placing the concrete for the roof. The roof should be finished in the same manner as a floor or sidewalk, using tools commonly employed for that purpose. One of the most important points in successfully constructing concrete roofs is to protect the concrete from the weather until thoroughly hardened. Newly made roofs should be covered with wet straw or other material suitable for the retention of moisture, in order that the concrete may be protected from the action of sun, wind and rain for a period of at least two weeks.

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Treatment of a Dance Hall Floor

A contractor down in Kentucky had a lodge room floor to treat so that it could be used for dancing. The floor was of maple and had been cleaned with a power sandpaper machine so that it was smooth, level and clean. He had thought that he would fill and give two coats of a good floor varnish, then wax and polish it, but the trustees seemed to think the varnish would not stand the wear of dancing and would mar badly. The contractor, however, thought that as long as the floor was kept well waxed the varnish would not get much wear and yet would be a good foundation for the wax. In order to decide the matter he wrote to the *Painters Magazine*, stating the case, and in reply the following suggestions were offered:

Maple floors do not require filling. When used for dancing the very best thing is to give them several coats of prepared white floor wax, using a weighted floor brush for polishing. While filling is not required, one coat of white shellac varnish will make a good ground for the wax, but the wax will itself make a good filler.

When a maple floor is to be varnished in order to keep it light in color three coats of white shellac varnish should be applied and if subjected to hard wear, as for instance dancing, a coat of special floor oil made of nine parts raw linseed oil and one part japan dryer, well rubbed in over the shellac varnish with a weighted brush will preserve the varnish and present a better finish for dancing, not being so slippery, but having a dull smooth surface. As the floor becomes worn it should be gone over at least every few weeks with a floor oil made up of seven pints raw linseed oil, two pints turpentine and one pint of white shellac varnish. This should be applied with a brush and then rubbed in with a cloth wrapped about a weighted floor brush so that it will not remain sticky.

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Lumbering Industry of the Philippines

The timber resources of the Philippines, their exploitation, and the market for American sawmill and woodworking machinery comprise the subject matter of a monograph, "Lumbering Industry of the Philippines," Special Agents' Series No. 88, just issued by the Bureau of Foriegn and Domestic Commerce. The area of timber in the islands is said to be 60,000 square miles, of which 40,000 are virgin forest. This forest contains some of the finest hardwood timber in the world, which can be used, as enumerated in the monograph, for high-grade cabinet work, furniture manufacture, house construction, bridge and wharf construction, keels, posts, vehicles, wheels, railroad ties, paving blocks, and ship planking.

At present little is exported, as the supply is practically absorbed by the home demand. The industry, however, is capable of great expansion. The Director of Forestry estimates that 10 times the present output of timber could be cut without diminishing the productivity of the forests, and one operator asserts that there is room now for $10,000,000 capital. More than 99 per cent. of the timber in the Philippines is owned by the government and is worked through concessions and licenses, as no land more valuable for timber than for agriculture can be bought. The valuable trees of the same species are often scattered through the forests instead of being grouped, and this makes lumbering more expensive.

American sawmill and woodworking machinery is very largely sold, nearly all imports being from the United States. The demand is of practically the same character as in this country, but band saws and solid-tooth circular saws, although effective, can not be widely used because of the grade of labor available and the difficulty of making repairs.

◆

New Building Ordinance for Manila

An ordinance has just been passed by the Municipal Board of Manila providing that all buildings hereafter constructed in that city must be rat-proof, the measure being intended to safeguard the public health against bubonic plague. Hollow walls and partitions are forbidden. Walls, with the exception of those of solid wood, must be of concrete, brick, stone or other material that will keep out rats, at a height of one meter (3.28 feet) from the ground and must extend below the surface of the ground at least twice the thickness of the wall. All hollow construction is forbidden except it be without apertures through which rats may pass and of materials through which they cannot make way.

Concrete for Repairing Buildings

How Building Supports and Foundations May Readily Be Repaired by the Use of Concrete

By Percy H. Wilson

A COMMON source of annoyance and expense on the farm is the decay or giving way of building supports and foundations. When this occurs it is considerable trouble to replace these with new timber or ordinary masonry. It frequently happens that a building is in first-class condition while its supports have disintegrated or collapsed. For making repairs of this character concrete surpasses any other material. This is due to the fact that it is a plastic substance and may be molded or poured into recesses not readily accessible when another material is used. Timber supports may be renewed without jacking up the building beyond its original elevation.

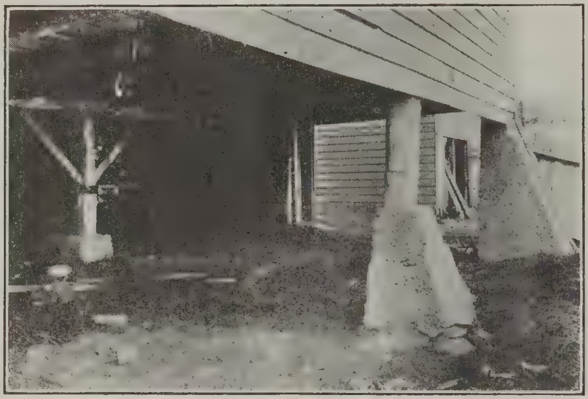

Fig. 1—Showing use of Concrete in Repair Work

For example, let it be assumed that a building is resting upon wooden or timber supports which have decayed at the ground level, which always occurs when timber is subjected to alternate wetting and drying. It is an exceedingly simple matter to remedy a situation of this kind with concrete. One has merely to support the building with temporary struts, which should be placed near the post to be removed. The old post should then be sawed off entirely above the rotten part, the suspended part consisting of sound timber. Directly under this suspended post, dig a hole 2 feet deep and slightly larger than the post itself. Fill the hole with a mixture of concrete consisting of one part Portland cement, two parts sand and four parts stone. On top of this place a box with open ends, its inside measurement conforming to the dimensions of the hole. This box should be made and ready to use before any concrete is mixed or placed. Its length should be sufficient to reach from the ground to a few inches above the bottom of the sawed support. When in position, fill it with concrete until the bottom of the sawed-off post is imbedded about a half-inch in the concrete. Proceed as above with each support, leaving the boxes or forms in place for one week, and after two weeks the struts used as a temporary support for the building may be removed. The concrete should be mixed thoroughly wet and tamped or puddled while being placed.

In the case of large buildings elevated quite a distance above the ground, the new support or foundation may be made larger at the bottom than at the top by sloping one side of the box form, as shown in Fig. 1.

In Fig. 2 is shown a cross section of a foundation wall indicating how the "forms" are made.

The farmer with the help of his farm hands can replace a continuous foundation with concrete even where buildings are quite large and the foundation is of the continuous type, requiring jacking up of the structure. At necessary points remove a few heavy stones or bricks, as the case may be, and insert short pieces of heavy timber to wedge up the building. The building should be carefully raised by this means until entirely free from all foundation. Then remove all of the old foundation and set in place the forms for the concrete. In the case of small buildings it is usually feasible to raise them high enough to allow working room, in which case the form may be filled right up to the top with concrete. The concrete should be a wet mixture consisting of one part Portland cement, two parts sand and four parts stone.

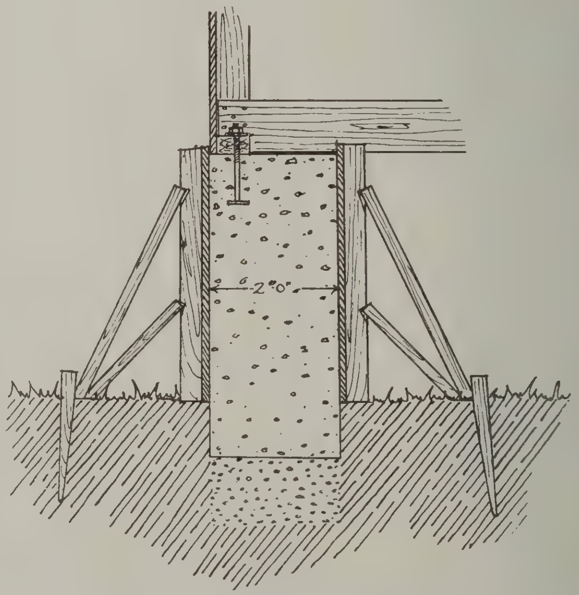

Fig. 2—Cross-Section of a Wall, Showing How the "Forms" Should Be Made

Should the building be too large and heavy to be raised to a hight that will give head room, merely make the foundations 3 inches wider than the sill.

Then when the forms are carried to the desired hight the concrete may be inserted through this extra space of three inches. To facilitate the placing of the first layers of concrete the top board of the forms may be left off until ready to place the last of the concrete. This last batch should be very wet. The concrete should be tamped until it comes up flush to the bottom of the sill and to the entire width of the wall.

Make certain that a space is left in the concrete wall under and on the sides of the underpinning support so that the building may be lowered onto the new foundation and the timber removed. This opening, of course, must be slightly larger than the underpinning support. The building should not be lowered until the foundation has been in place two weeks, and after this is done the openings occupied by the underpinning may be filled with concrete.

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The Planning of Small Houses

It is a proverbial fact, among architects and builders, that every man strives to build a larger home than he can afford. Even the man who builds a three-room bungalow goes into debt before the home is complete in order to have it a little better than he might get along with for a while, at least. The man who (without persuasion from his architect) voluntarily decides to see how small he can build a home and have it fill his needs would, according to a writer in the Pittsburgh *Gazette-Times,* be a curiosity to the average builder or architect.

The planning of a small home is more difficult than the planning of a larger one to meet the requirements of the same family. Not because the arrangement cannot be as convenient, for anything built on a large scale can be built on a small scale, within a certain reasonable minimum, but because the average person has an exaggerated idea as to how much room he needs for living purposes.

When sitting in the parlor, with two or three friends, the actual space that is taken up together with the usual parlor furniture is not considerable; when the dining room is openly connected with the parlor, the effect of distance prevents a cramped or stuffy appearance.

In the dining room, of course, the size of the table, together with the fact that a passage must be maintained around the outside of the seated guests, establishes a ten-foot minimum for the least dimension. The dining room should be made a little longer than its narrowest dimension, to permit extension of the table on special occasions. This extra length is often obtained by projecting a bay, which, when properly designed, adds to the attractiveness both within and without.

Some people think they simply cannot get along without a den. The writer admits that he is one of those people. A little place, even if not more than five feet wide, in which to study, write, read, or converse privately is always a convenient accessory. Placing a comfortable couch in it makes an extra bedroom on special occasions. In a small home, however, this space can be distributed between the other rooms and one of the bedrooms furnished to take its place. The number of chambers is, of course, established by the number in the family and the number of expected guests.

A fireplace is always a splendid thing in any home, for its cheerfulness and the heat it affords on mild winter days, as well as being a splendid ventilator at all times, but it is expensive, and takes up altogether too much room for a small home. It should, therefore, be omitted, together with such desirable but unnecessary luxuries as a first-floor toilet room, large pantry and conservatory.

For the best appearance a home of small dimensions should not be full two stories high. Making the hight of the first story not over 9 feet increases the size of the rooms in appearance and makes it unnecessary to project the second story quite so high into the air. While it must be admitted that a slant in the bedroom ceiling is not the most desirable thing, still, when the slant starts not lower than 5½ feet or 6 feet from the floor, it is not in the way of bedroom wall furniture, and does not interfere with head room, even at 5½ feet, for no one stands or walks against the wall.

When the slanted part of the ceiling is insulated properly from the weather and the room is properly ventilated, it does not make the room either hotter or colder; in fact, it requires a little less heat radiation in winter.

From an investment standpoint it is a significant fact that small homes containing a sufficient number of rooms and all modern conveniences sell better and at larger profits in proportion to the investment than larger and more costly homes, which would indicate that the average homebuilder would be content with rooms not quite so large as he thinks is necessary when planning a home if he could only see a home in every other way meeting his requirements, with rooms just large enough to be practical and homelike.

◆

Municipal Tenements

The city of Freiburg, Baden, Germany, plans to build 15 small residences costing $168,300, as there is a shortage of small, low-priced houses. Especially is it difficult for families with children to obtain suitable, cheap homes, which the city proposes to remedy. These 15 houses will be divided into 24 two-room apartments and 82 three-room apartments and it is calculated they will rent for $9,068, which is nearly 5½ per cent on their cost.

◆

Some interesting information on the mortar making qualities of Illinois sands are contained in a Bulletin issued by the University of Illinois at Urbana. The matter has been prepared by C. C. Wiley, associate in civil engineering, and in addition to a description of the various tests carried out at the engineering experiment station there is an interesting discussion together with diagrams showing sieve analysis curves for the various samples.

◆

Thomas G. Carlin, who for many years was identified with the building business in Brooklyn, N. Y., is dead at the age of 54 years. He was the son of the late P. J. Carlin, one of the best known builders of his day, and after completing his school education he went into business with his father. Later he became president of the Thos. G. Carlin Contracting Company. One of his brothers is P. J. Carlin, Superintendent of the Bureau of Buildings for the Borough of Brooklyn, N. Y.

Brief Review of the Building Situation

Reports Which Indicate Some Rather Startling Changes in August as Compared with the Same Month a Year Ago

THE figures available covering building operations in August in 96 cities of the country reflect in much more striking degree than was the case in July the growing feeling of conservatism which pervades the business community. Of the cities reporting 45 show an increase and 51 a decrease, and indicate for the entire country a loss of a trifle more than 19 per cent. as compared with August, 1913. In the extreme eastern and southern states there has been increased activity in building operations, while in the cities of the middle states and on the Pacific Coast a heavy falling off is indicated.

For the sake of convenience we have divided the country into four sections, the one embracing the eastern states showing a gain of 12.6 per cent. and of the 36 cities reporting 21 indicate a gain and 15 a loss. The accompanying table will permit of intelligent comparison on the part of the interested reader:

Cities in the Eastern States

	1914	1913
Albany	479,685	577,180
Allentown	79,211	118,000
Boston	1,574,994	927,173
Bridgeport	147,063	409,060
Buffalo	950,000	682,000
East Orange	43,210	104,536
Easton, Pa.	125,000	105,500
Erie, Pa.	366,290	152,985
Harrisburg	101,275	95,565
Hartford	185,990	554,425
Jersey City	401,804	213,437
Manchester, N. H	137,255	80,509
Newark, N. J	3,196,283	1,814,638
New Bedford, Mass	172,000	105,000
New Haven	500,567	258,693
New York:		
Manhattan	4,476,176	4,458,991
Bronx	1,272,343	1,201,643
Brooklyn	4,293,140	2,663,107
Queens	1,020,758	1,154,714
Paterson	221,958	49,630
Philadelphia	2,643,810	3,616,860
Pittsburgh	1,127,069	1,059,662
Portland, Me.	129,825	104,750
Reading	29,400	107,600
Rochester	808,457	791,643
Schenectady	103,058	256,690
Scranton	85,388	63,629
Springfield, Mass.	780,850	274,495
Syracuse	256,948	501,145
Trenton	137,681	211,425
Troy	51,275	141,780
Utica	20,630	49,325
Wilkes-Barre	28,731	137,644
Williamsport	21,960	36,080
Worcester	679,692	241,993
Yonkers, N. Y.	204,500	143,600

Taking the cities of the middle or central states of the country we find 15 showing a gain and 18 a loss with totals indicating a radical change from August last year. In fact the falling off amounts to 54.4 per cent., this being brought about by heavy shrinkages in Cleveland, Indianapolis, Kansas City, Milwaukee, Minneapolis, St. Louis and Youngstown. The great difference in the figures for Cleveland for the two periods named is due to the fact that in August, 1913, a permit was issued for a store building costing $2,200,000. Cities showing important increases include Canton, Toledo, Cincinnati and Columbus, Ohio; Duluth, Minn., Peoria, Ill.

Cities in the Middle States

	1914	1913
Akron	602,315	354,125
Canton	314,500	90,815
Cedar Rapids	282,000	250,000
Chicago	5,769,500	5,762,100
Cincinnati	1,128,060	504,130
Cleveland	2,318,470	4,041,970
Columbus	647,325	495,140
Davenport	91,205	119,235
Dayton	111,643	144,460
Des Moines	111,150	88,775
Detroit	2,353,445	2,608,825
Duluth	238,023	156,960
Evansville	76,495	171,375
Fort Wayne	153,800	174,175
Indianapolis	472,436	700,768
Kansas City	527,395	827,475
Lincoln	136,865	75,115
Little Rock	83,313	88,665
Milwaukee	621,284	1,163,013
Minneapolis	933,405	1,211,230
Omaha	521,065	536,515
Peoria	259,381	161,510
St. Joseph	93,623	42,970
St. Louis	797,160	1,082,947
St. Paul	646,921	775,134
Sioux City	223,485	120,550
South Bend	119,316	113,472
Springfield, Ill.	72,800	70,025
Toledo	490,047	357,435
Topeka	20,630	49,325
Wichita	34,925	60,625
Youngstown	56,500	227,725
Zanesville	17,620	53,950

In the cities reporting from the southern states 7 show a gain and 11 a loss, but giving a gain for the entire district of 2.76 per cent. Here the important increases are shown in Baltimore, Norfolk, Wilmington and Oklahoma City. Important decreases occur in Dallas, Texas; Memphis, Richmond, Waco, Texas, and Washington, D.C.

Cities in the Southern States

	1914	1913
Atlanta	372,033	348,256
Baltimore	1,985,280	1,176,183
Beaumont, Tex.	39,550	26,550
Birmingham	314,549	333,385
Chattanooga	128,800	125,435
Dallas	220,175	409,800
Louisville	426,860	445,210
Memphis	175,660	321,116
Montgomery	49,415	71,415
New Orleans	236,910	295,260
Norfolk	257,635	100,357
Oklahoma City	99,115	4,875
Richmond	183,410	304,343
Savannah	106,590	113,520
Shreveport	79,506	104,438
Waco, Texas	26,395	260,530
Washington	491,576	627,472
Wilmington, Del.	203,059	179,448

Coming now to the cities of the extreme west we find a loss of a trifle more than 30 per cent. in the cities reporting. This is due very largely to the heavy shrinkage in building activity in Los Angeles, Oakland, Cal., and Portland, Ore. On the other hand, important increases are found in Salt Lake City and Seattle.

Cities in the Western States

	1914	1913
Denver	150,000	233,810
Los Angeles	1,287,498	3,501,593
Oakland, Cal.	411,889	1,080,996
Portland, Ore.	409,390	1,168,245
Salt Lake City	480,045	129,945
San Francisco	1,415,271	1,613,881
Seattle	1,565,525	582,425
Spokane	31,445	110,929
Tacoma	139,460	152,737

◆

The new building which is to be erected on the block bounded by Columbus Circle, Broadway, Central Park West and 61st Street, New York City, will be three stories in hight, but will have foundations of heavy construction and sufficient strength to carry the building up to a hight of 30 stories if future requirements should make it necessary. The present building will have a façade of limestone, will contain 21 stores and have a direct entrance from the subway station at 59th Street. The plans were drawn by James C. Green and the estimate of cost of the improvement is placed at $420,000.

Wanted the Best—So Got "Burts"

First read this letter——and then this one

Rochester, N. Y., Feb. 12, 1907.
The Burt Mfg. Co., Akron, Ohio.

Gentlemen—We wish you to name us price on your ventilators. We expect to be able to use about twenty-five in our printing press room.

We want a good ventilator, which you can guarantee will take the air out in summer on hot muggy days when it is very oppressive, and the temperature above 80 degrees. We have six or seven ventilators at the present time, but find we have no success with them. The air will not move and remains stagnant, and the reflection from the glass heats up the air in this condition more so. Yours very truly,

STECHER LITHOGRAPHIC CO.

Rochester, N. Y., October 7, 1907.
The Burt Mfg. Co., Akron, Ohio.

Gentlemen—Yours of the 10th received, and note we have fifteen of your 48-inch ventilators installed and have been using them through the hot months just passed. Can conscientiously say we are much pleased with them, the result being beyond what we expected.

Have just mailed you an order for another and expect to adopt your make of ventilators as fast as we have use for a ventilator of any kind.

Yours very truly,
STECHER LITHOGRAPHIC CO.

October 1st, 1909, ordered 25 48-inch in addition to above.

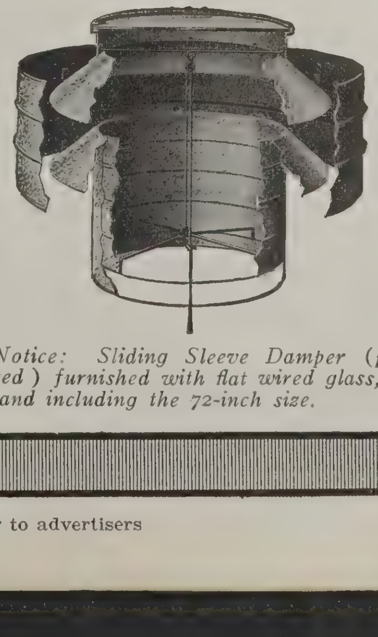
BURT Combination Skylight and VENTILATORS

possess features not found in any other ventilator. It has a sliding-sleeve damper, which, having no flat surface, cannot collect dust or refuse, to be shaken off into the building, as is the case with all other dampers.

It is a combination skylight and ventilator in which the light is never obscured or shut out.

The temperature of the building can easily and exactly be regulated by the use of the sliding-sleeve damper.

Send for 128-page catalog, giving fine illustrations of factories, mills, shops and residences where Burt Ventilators are being used successfully.



Notice: Sliding Sleeve Damper (patented) furnished with flat wired glass, up to and including the 72-inch size.

The Burt Manufacturing Co.
312 Main Street, Akron, Ohio

GEO. W. REED & CO., Montreal, Sole Manufacturers of "Burt" Ventilators in Canada

Free! Free!! Free!!!

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ERIAL CATALOG
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Perfect in Design and Workmanship
Construction Especially Adapted to Outside Use
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CRAFTSMAN "D"
MONTE CARLO
PARIS
QUEBEC
Special Hardware for Front Doors Illustrated on this Page
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ows in Exclusive Designs
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PROTECT YOUR HOME AND HEALTH!
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Storm Sash Fastener
Storm Door Hardware—Butts, Latches,
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Wrought Steel Butt

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INDEX 136 Pages

(Color Illustrated)

Bargains

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Free Catalog illustrates prices and describes all building material—Doors, Windows, Casings, Mouldings, Hardwood Floors, Storm Sash and Doors, Roofing, Stair Work, Siding, Porch Work, Wall Board, Shingles, Paint, Builders' Hardware, etc. Save $100 to $300 on Lumber in carload lots. Freight only a trifle. For every nickel of freight cost—*We Save You Dollars in Price.*

WRITE!

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

The Ajax Furnace for Low Cellars

The question of proper heating installation for the dwelling is one of the many which command the attention of the architect, the builder and the house-owner, and just at the present time the matter is being given more than the usual amount of thought. Furnace heating for the home has a host of advocates by reason of the convenience of the system and the results which are accomplished by means of it. In the early fall before it is time to start the regular winter fire in the furnace there frequently occur days when a little heat would be acceptable. In such cases a fire can be started in the furnace and after the house has become warm and the chill taken off the air the fire may be allowed to die out. A warm air furnace which is particularly adapted for heating private dwellings is that which we illustrate in sectional view in Fig. 1. It is of low construction and therefore well suited to houses where insufficiency of cellar depth interferes with the proper pitch of hot air pipes. It can be installed in a cellar as low as 4 ft. 10 in., but its construction, however, is such as to render it equally effective when installed in houses having cellars of the usual hight.

It is known as the Ajax, made by the Co-Operative Foundry Company, Rochester, N. Y., and is intended for using hard coal or wood as a fuel. It has extra deep ashpit, a large and double feed door admitting wood of liberal dimensions for spring and fall use. The firepot is straight and ribbed. The products of combustion move first to the back flue and consequently do not puff out into the cellar when the feed door is opened for introduction of fuel. The grate is of the triangular type, is easily removed, it being only necessary to lift it up and slide it out as shown in the illustration. The radiator is made of 16 gauge steel with 12 gauge in the dome. The point is made that in this construction an unusually large volume of air can be warmed with a very moderate consumption of fuel.

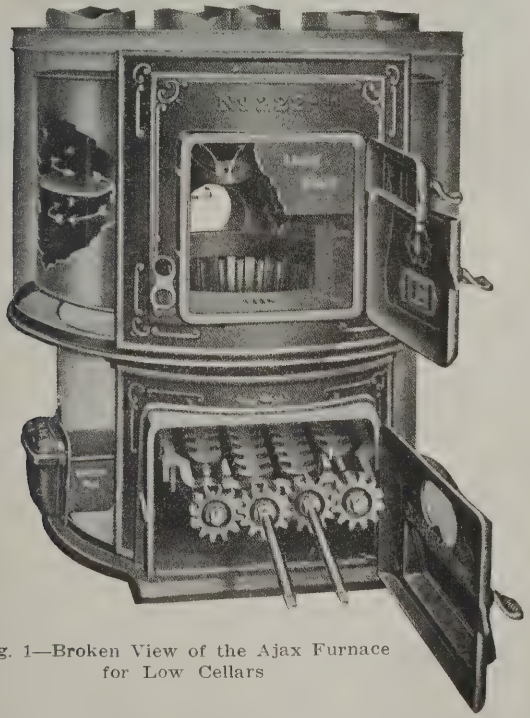

Fig. 1—Broken View of the Ajax Furnace for Low Cellars

The Forbes Furnace

Another warm air heater specially adapted for cellars of moderate depth is the Forbes, a sectional view of which is presented in Fig. 2, and which is manufactured by the Tubular Heating & Ventilator Company, 232 Quarry street, Philadelphia, Pa. The construction requires that the galvanized iron casing shall be oval in form. Toward the front is the usual ashpit which is equipped with a labor-saving grate and above it is the firepot, corrugated to increase the heating surface. On it rests a large combustion dome from the center and the top of which is a large outlet leading to a radiator head with which are connected several tubes on which there are extending webs to increase the heating surface. These tubes connect at the bottom with another radiator head and by the manipulation of the damper, the draft can be made direct to the chimney or it can be directed down the side flues of the radiator to the bottom radiator head and then up the center so as to get a long fire travel. With this arrangement a large amount of heating surface is exposed to the air passing through the furnace and the air entering the furnace strikes against the cooler surfaces first and meets hotter surfaces as it rises on its passage to the warm air pipe. The construction provides but few joints and these are of the cup type and so arranged that they can be made with the cement insuring permanent tightness. A feature that is attractive to the heating contractor is the ease with which the different parts of the furnace can be set up and the care which has been taken to see that every part fits snugly before shipment is made. The large combustion chamber permits of the use of water heaters for supplying hot water for domestic purposes or for circulating through radiators in distant rooms. The furnace is made in nine different sizes with firepots from 14 to 30 in. in diameter.

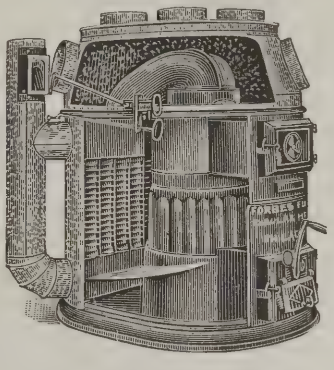

Fig. 2—Sectional View of the Forbes Warm Air Furnace

Brien Warm Air Heaters

A powerful warm air furnace of the low down type, the largest size being only 50 in. in hight over all, is the Brien, a vertical sectional view of which is shown in Fig. 3. The heater is provided with two complete casings with a ¾-in. air space between. It is so built that it is unnecessary to remove the warm air pipes when it is desired to inspect castings, it being only required to remove the bolts on the sides and raise the casings. The heater is constructed with flanged joints bolted together with asbestos fiber packing between. No furnace cement is used to crack and drop out and allow gas and dust to pass through the warm air pipes into the house. In other words, it is claimed to be absolutely gas and dust proof. It is entirely constructed of cast iron, has oblong firepot which gives the greatest radiating surface in proportion to grate area. It is made by the Brien Heater Company, Westfield, Mass., who refer to it as "the hottest thing on earth."

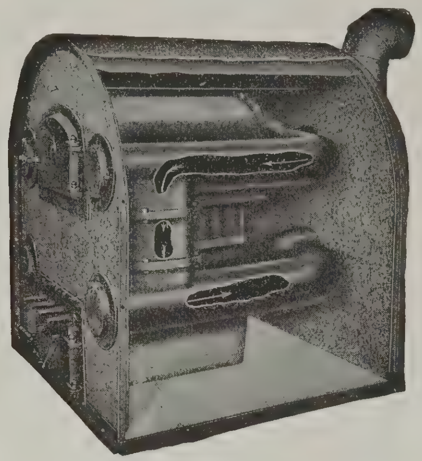
Fig. 3—Broken View Showing Internal Construction of a Brien Heater

Robinson Tubular Furnace

In Fig. 4 is shown a sectional view of what is known as the Robinson Tubular Furnace made by the Robinson Furnace Company, Chicago, Ill. This is of low down construction and has seamless boiler flues in the radiator through which the air must pass before reaching the supply pipes to the various rooms of the house in which it is installed. It is provided with Eclipse firepot, the lower sections of which have pockets through which air is fed to the fire to aid combustion. It also has the Eclipse grate, the shaking ring of which is mounted on rollers and is easily moved from right to left. The ring slopes towards the center so that the cinders are worked on to the dump center, which, when reversed, dumps the ashes into the ashpit. A patented smoke box forms part of the "Tubular" furnace equipment. When the damper is turned down the products of combustion go directly to the smoke pipe, but when turned up forces the gases around the radiator twice before they reach the smoke pipe. The check draft is located on the smoke box and all air taken in at this point is drawn down under the plate into the smoke pipe, eliminating any direct connection between the smoke exit and the check draft. The smoke box is made to swing on hinges to allow the radiator to be cleaned conveniently.

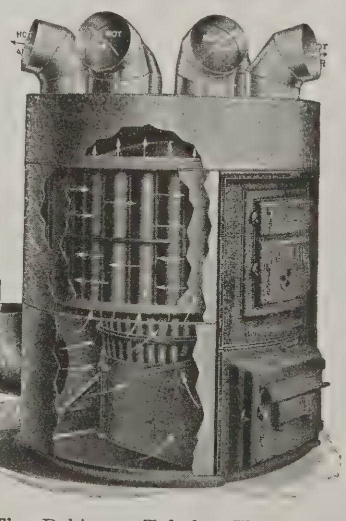
Fig. 4—The Robinson Tubular Hot Air Furnace

The King Dumbwaiter

In the construction of dumbwaiters one of the desirable features is an arrangement which will hold the car at any point desired, and in the King dumbwaiter, which is offered to the trade as a strictly high-grade construction, yet moderate in price, one of the points on which the manufacturer bases his claims to superiority is a safety check for holding the load at any floor. The car is constructed of selected chestnut, is properly ironed and braced and has a folding shelf. The outfit includes special guide wheels which insure a thoroughly noiseless movement of the dumbwaiter. Emphasis is laid upon the fact that there are no wooden pins to break in the weight. The dumbwaiter in question is made by William F. King, 21 Kingsland Avenue, Brooklyn, N. Y., and any reader of *The Building Age*, who may be interested can secure full particulars on application to that address.

Flaxlinum—A New Insulating Material

It is a well-known fact that if a building is carefully insulated in its outer walls it will prove to be much cooler in summer and warmer in winter than would otherwise be the case, and one of the latest candidates for popular favor in the way of a material for this purpose is what is known as "Flaxlinum." This is a corrugated flexible felt made from a pure flax fiber and is referred to as an excellent substitute for back plaster, as well as especially serviceable as a deadening felt. For the latter purpose the material is supplied in strips 3 in. wide by 3 ft. in length, thus rendering it especially useful over joists. In the preparation of "Flaxlinum" the flax fiber passes through many chemical processes and machine operations before it is finally inspected as fit for installation. After the flax has been put into the digesters for the purpose of degumming, it is cooked for twelve hours under a steam pressure of 350 lbs. It is then put through felting machines, which quilt it into a strong felt. The drying operation is undertaken in klins and then the material is made into sheets and strips of standard sizes. The company's strongest recommendation for "Flaxlinum" is that it is a fuel saver, and adds considerably to the economy and comfort of the home. Its method of application between the studding is clearly shown in Fig. 5, which represents a workman about to nail a sheet between the studs of a wall. "Flaxlinum" is easily and quickly applied, and will not tear or decay. One half inch of this material is flexible enough to allow the settling of a building without cracking, and the flax fiber makes it indestructible. It can be cut like lumber, and may be nailed to sheathing with ordinary

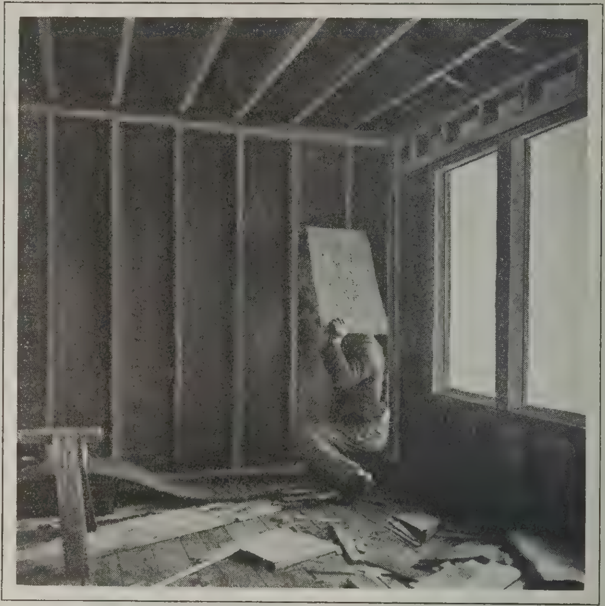
Fig. 5—Interior View Showing Application of Flaxlinum

(*Continued on page 70*)

Four Facts

Every Builder Should Know About

Arkansas Soft Pine

WHY TO USE IT: Because nails do not split this wood nor is the surface broken or marred when the nails are set. (See illustration). Because it may be finished with paint, stain or enamel; because the wood is light and easy to work.

HOW TO USE IT: It should be used in the manner and for the purposes for which it is recommended. For cornice work, porch work, siding and the interior trim and woodwork it has no superior.

WHEN TO USE IT: When you want results that satisfy you, the builder, and please the owner; when you want the structure to serve as an advertisement of your skill, use Arkansas Soft Pine.

WHERE TO USE IT: Keep a "bone dry" supply for jobbing work, insist on Arkansas Soft Pine framing and trim for small frame buildings, and insist on Arkansas Soft Pine Trim when something extra fine is wanted.

Get a copy of our "Use Book" and learn all about the modern method of ceiling and finishing porches. It will be sent free on request.

Arkansas Soft Pine Bureau

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Here's a mahogany finish that won't fade

You've long wished for a fadeless mahogany finish. You can get it if you specifiy a coat of Lowe Brothers Non-Fading, Dark Mahogany Oil Stain; then one of

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Gives you the essential facts for preparing clear and definite specifications on varnish and paint—tells how to select the proper materials and use them to best advantage. Write for this book today.

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See Sweet's Catalog, 1914 Edition, pages 1916-1917

Black Diamond File Works

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TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
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Owned and Operated by Nicholson File Company

roofing nails. Under actual tests ½-in. thickness of "Flaxlinum" has been proved to be equal to 4¾ in. of pine lumber, 4½ in. of back plaster, and 38 thicknesses of building paper. This insulating material is suitable for all climates, and recommendations from users in Northwestern territory, where the winter temperatures are as low as 40 deg. below zero, are testimony that the material is effective in keeping a house warm under very adverse conditions. "Flaxlinum" is made in four thicknesses, from ¼ to 1 in., and in standard sizes of 3 x 8 ft. It is also made flanged to fit between the studdings, 16-in. centers, in lengths of 8½, 9, 9½ ft. in ½ and ¼ in. thicknesses. It is made by the Northern Insulating Company, 1340 to 1400 University Avenue, St. Paul, Minn., and copies of the pamphlets, which have been issued together with a sample of the material in question, will be sent to any architect, builder or contractor making application for them.

Silver's Swing Cut-Off Saw

The new Swing Cut-off Saw which we illustrate in Fig. 6 of the engravings has recently been added to its line of high grade wood working machinery by the Silver Manufacturing Co., 350 Broadway, Salem, O. The frame is cored, is in one piece and very heavy. It is suspended from the counter-shaft close to the hangers in such a way that its weight does not bind or interfere in any way with the free movement of the pulleys. The saw-arbor is of machinery steel 1½ inches in diameter and ground to accurate size. The two long bearings in which it rests are adjustable for wear. Each bearing cap contains a large oil pocket and is held in position by 4 cap screws. The length of the saw-arbor is 18½ inches, and the diameter of the saw-collars is 5 inches. The shield for covering the saw and protecting the operator is made of cast iron securely bolted to the main frame and can be quickly removed when desired. The floor space required by this swing cut-off saw is 50 by 42 inches. The driving pulley is 16 inches in diameter, has a 5½ inch face and gives the saw a speed of 2000 revolutions per minute. The belt shifter can be used on either the front or the back of the machine and the forks are also reversible, making a sure and easy shift under any condition of belting. The company points out that the shifter is stationary, does not swing with the saw, and holds the belt without creeping.

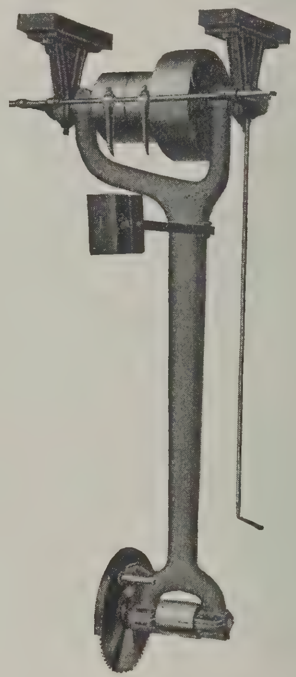


Fig. 6—General View of Silver's Swing Cut-off Saw

The Garden City Sand Company, Chicago, Ill., made an interesting display of its molding sand, "Stonekote" waterproofing and building materials at the recent

(*Continued on page 72*)

Do You Want to Be as Busy This Winter as You Were Last Summer?

Join our army of floor layers and overcome winter's dullness.

Scores of Buildings in your town need new floors. To get orders for these floors and to lay them will keep you busy during the coming winter.

This work will keep you in touch with people who want things and who can afford to have them.

Get the flooring jobs and you will get many other odd repair and improvement jobs. While putting in the floor you will have a chance to talk screen repairs, new screens, and other repair and alteration work.

Get this work and get it out of the way before the spring rush sets in. Then when spring work opens up you will have time and men to attend to your share of it.

Before you start! Send for booklet telling how to get orders for Maple, Beech and Birch floors, sent free on request.

Maple Flooring Manufacturers' Association

Stock Exchange Building Chicago, Ill.

Wrought Steel Stanley Quality

Japanned or Stanley Sherardized

"PEERLESS"

Storm Sash Hangers and Fasteners

No. 1717 Hangers.
No. 1719 Fasteners.
The No. 1719 Fastener is made in 5-inch and 10-inch sizes. The 5 inch for 4-foot windows and smaller — the 10 inch for windows over 4 feet.

Just the hardware you want for your Storm Sash. Once applied, no tools are needed to take down or put up the Sash. Full length screens can be hung on the same hooks. The Fasteners hold the Sash firmly in place either open or closed.

Write for Circular "E." It tells the whole story.

THE STANLEY WORKS
New York New Britain, Conn. Chicago

The sight of the "Yankee" Tool brings to memory many a difficult job easily and quickly performed. Perhaps he is wondering how he ever got along without "Yankee" Tools. Perhaps he is wondering how he could ever keep up with the boys and keep his job without them.

Every "Yankee" Tool adds to your efficiency as a mechanic. There are now over one hundred different styles and sizes. Your dealer can supply you.

Let us send you a "Yankee" Tool Book. A postal brings it.

NORTH BROS. MFG. CO.
Lehigh Avenue Philadelphia, Pa.

Foundry and Machine Exhibition held at the International Amphitheater in Chicago, Ill.

A Tribute to Bridgeport Standard Wood Finishes

It is not often that the product of a company receives a higher tribute from a user than do the finishes made by the Bridgeport Wood Finishing Company, Box 104, New Milford, Conn., in the handsome *brochure* of Morgan doors recently issued by the Morgan Sash & Door Company, of Chicago, Ill. The latter company evidently realizing that no matter how distinctive might be its doors the latter would fail to give satisfaction to customers unless they were properly finished. A very thorough investigation was therefore made of the subject of wood finishing material with the idea of recommending that which seemed best for use on all its doors. As a result, the Morgan Company expresses the belief "that the best results in treating and finishing Morgan doors will be obtained by using Bridgeport Standard Wood Finishing products only." The company states that it is familiar with the product of the Bridgeport Wood Finishing Company, and in specifying its finishes the Morgan Company is giving to its customers the experience of a concern which has been in the wood finishing business for more than forty years.

The Kees Shingling Gauge

Some years ago there appeared in the Correspondence Department of this journal a series of letters from carpenters and builders describing the amount of work which a man could do in a day In the course of the discussion reference was made to the large total of shingles which a man could put on a roof in a stated time and it developed that this was accomplished by the use of an attachment which the workman used on his shingling hatchet. It is known as a shingling gauge and one of the latest devices of this nature is that which is illustrated in Fig. 7 and made by the F. D. Kees Mfg. Company, Beatrice, Neb. The gauge is of such a nature that it is easily and quickly attached to any shingling hatchet and it has seven adjustments by ¼ in. ranging from 4¼ to 6 in. It is light in weight yet strong and accurate and does not spoil the balance or swing of the hatchet. The gauge cannot slip or work loose and operates equally well right or left hand. The device is made of 14 gauge cold rolled stamped steel, polished and nickel plated. The use of the gauge eliminates measuring, chalk lining, straight edges, etc., and the claim is made that a man can shingle a roof without an assistant and take care of as many courses as he can reach.

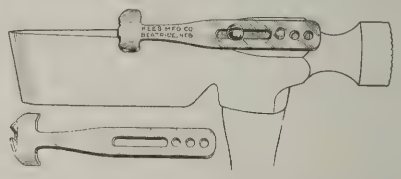


Fig. 7—Kees Shingling Gauge—Showing Its Appearance When Applied to a Shingling Hatchet

Something New in Porch Ceilings

There is usually more than one way of doing a piece of work in order to render it satisfactory in the end, and sometimes the way that seems the easiest is in reality the most difficult. A man blazes a trail and countless thousands follow after him; but one day the right road is found and it becomes the great thoroughfare. The principles involved apply to the application of porch ceilings as well as to many other things which might be mentioned. The custom in one town may be to run the ceiling joist from the house to the outer plate and put on the ceiling lengthwise of the porch. The question might naturally arise why not lay the ceiling joist the same way as the floor joist on all porches not exceeding 20 ft. in length? On longer porches the joist may be stripped with 1 x 3 in. stuff and then the ceiling may be ordered of exactly the proper length. In this case the builder will find that it will go together

(*Continued on page* 74)

The Reason for the Price

$1650

Chassis Only

With Driver's Cab

Body Extra

Model J Two Tons

How Can the Motor Truck of Acknowledged Leadership Be Sold at the Lowest Price in the Two-Ton Field?

WHENEVER superior quality is encountered, it is customary to meet a high price. The Reo Model J, two-ton truck, which knows no equal in quality of construction, superiority of design, and the evidence of perfect performance is sold at a price which comparison will show to be the lowest in the two-ton market.

The reason for this lies in the immense Reo organization—the same great concern that builds and sells Reo the Fifth, the famous pleasure car.

Raw material, parts, accessories, etc., for Reo Motor Trucks are bought on the basis of the great Reo Motor Car production; the output has reached a point where each workman is a specialist; in selling trucks the immense Reo sales force of more than 1100 dealers is in a position to handle the trucks without additional selling cost. So it is apparent that the manufacturing and selling costs, the overhead and the buying cost are naturally lower than any other two ton truck builder enjoys; and that is the reason why the price of the Reo Model J is only $1650, whereas the average price of 54 competing trucks is $2701. Motor Trucks are not made in the great quantities which characterize the pleasure car business and the small truck maker whose total annual output may possibly run up to 500 or 1000 trucks, finds it a physical impossibility to compete with a factory that manufactures 20, 30 or 40 machines to his one. This in a measure accounts for the fact that during the past year the Reo truck has forged into the lead and today is the largest selling two-ton truck in America.

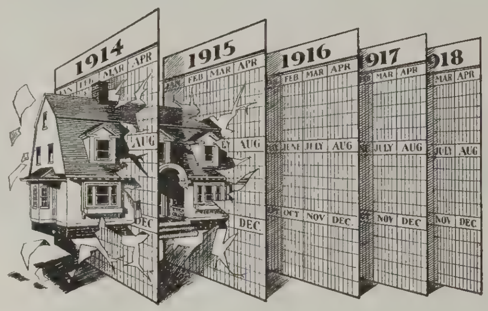
Call on the nearest Reo dealer and let him tell you about the Reo Motor Truck and explain Reo service. Reo Motor Truck catalog sent on request. Write for it today.

Specifications

Wheel base, 130 or 146 inches.
Motor, cushioned on sub-frame, away from road shocks and vibration.
Unit power plant.
Hydraulic governor prevents "racing" the motor.
Radiator built of 24 independent, interchangeable units.
Right hand central control.
Left side drive.
Impregnable armored frame.
Four speeds.
Multiple disc clutch.
Four Brakes.
Positive oiling system.

Reo Motor Truck Co.
Lansing, Mich.

The Paint on Your House Will Go Through More Years of Wear if Applied in the Fall—NOW



ALL authorities agree that Fall is the best time to paint, because the wood is then in proper condition. Paint penetrates deeper—gets a firmer hold—covers the surface better and lasts longer.

And your house needs protection more in Winter than any other season of the year.

Paint Your Buildings this Fall with

BRIDGEPORT STANDARD
PREPARED PAINT

and preserve them from the hard Winter storms. Likewise eliminate expensive repairs in the Spring—an item always more costly than a coat of paint.

BRIDGEPORT STANDARD PREPARED PAINT is always uniform—easy and free flowing—covers a given area with the least number of gallons—and far outlasts cheap adulterated paint or plain "lead and oil."

Don't put off painting. It's too costly. Remember, it is cheaper to paint than not to paint—if Bridgeport Standard is used.

TODAY—Send for color card and "Modern Painting For Beauty & Protection"—full of money-saving paint information.

SOLE MANUFACTURERS
THE BRIDGEPORT WOOD FINISHING CO.
Box 104 NEW MILFORD, CONN., U.S.A.
New York Chicago Boston

better, will lay straighter; that ceiling the porch will be a one-man job, and that the builder will save money and obtain better results all around. It is suggested that the builder order perfectly milled Arkansas soft pine stock, which shows good figure, and instead of painting or oiling the ceiling give it a coat of forest green or russet brown stain and then cover with a suitable varnish. The Arkansas Soft Pine Bureau is fathering this idea and is pushing it for the benefit of builders. The organization naturally desires to see its products used in the manner and for the purposes for which they are best adapted, to the end that the builder contractor and the owner will derive the greatest possible benefit from the use of good material. The idea of preserving for the owner the beautiful figure of Arkansas Soft Pine is one that should appeal to every contractor. If pains are used a light color, white or pearl gray, is recommended. This is one of the practical features of building discussed in the pamphlet entitled "Uses of Arkansas Soft Pine for Building," now ready for distribution by the Arkansas Soft Pine Bureau, 1738 Transportation Building, Chicago, Ill. We understand that any reader of *The Building Age* will on application be sent a copy of this little work.

Hack Saw Depth Gauge No. 53

A new tool which has recently been placed on the market by the Millers Falls Company, Millers Falls, Mass., and 28 Warren street, New York City, is the Hack Saw Depth Gauge No. 53 illustrated in Fig. 8 of the cut. It has been designed for the use of electricians and plumbers and meets a well-defined want along this line. The picture shows the most important use to which the gauge may be put, that is, the sawing of flexible conduits. The gauge is used for this purpose in order to prevent the cutting of the insulation on the wires contained in the conduits. The gauge may also be utilized as a stiffener to the ordinary all hard hack saw blades, permitting them to be used in place of flexible blades of inferior cutting qualities. This gauge is made of pressed steel of sufficiently rigid stock to withstand any strain to which it may be subjected. The thumb screws which hold the gauge in place on the hack saw blade are of case-hardened steel with points so shaped as to overlap and hold the gauge on the blade securely. The makers state that the tool is adapted for blades one-half inch or narrower.

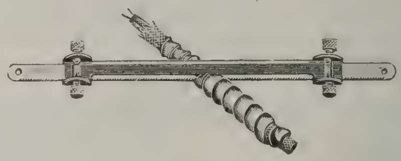


Fig. 8—Hack Saw Depth Gauge No. 53

Dickelman Metal Tile Roofing

The architect, the builder and the contractor is likely to find much to interest him in an attractive catalog of 38 pages bound in embossed paper covers which has been issued by the Dickelman Mfg. Company, Forest, Ohio. Not only are the company's embossed metal shingles and tile illustrated and described in attractive style but attention is given to its other high-grade roofing products. In discussing the merits of these goods the point is made that a good building with a poor roof is no better than a good building with a poor foundation, and that a good roof combines something more than mere protection to the contents of the structure. It should not only be of such a nature as to protect the building itself but at the same time be attractive and ornamental. Emphasis is laid upon the fact that the Dickelman Extra metal tile are adapted to any building wherever wood shingles, slate or strip metal are used; that is, on every building worthy of a good roof. In the catalog before us the metal tile are printed in color, the idea being to give to the illustrations as near as possible the appearance of the actual goods. Not the least interesting feature of the little work is an enumeration of some of the advantages of Dickelman

(*Continued on page 76*)

IMPOSSIBLE for us to name in a few lines all of the good things we have in the way of the newest and best tools but you should know about

The celebrated Buck Brothers' Chisels and Gouges—ask for catalog No. 3199. The Indispensable Jorgensen Adjustable Hand Screws—ask for circular No. 3200. The old reliable Colts Quick Acting Clamps—ask for catalog No. 3201. The genuine S. J. Addis London Carving Tools—ask for catalog No. 3202. Work Benches—ask for catalog No. 3203. Mitre Boxes—ask for catalog No. 3204.

We also carry regularly all the Yankee Tools, Stanley Rule and Level Co.'s and Miller Falls Lines, Hammond's Hammers and Hatchets, Russell Jennings' Bits, etc. You can purchase from us in one order all the best tools that the market offers. Correspondence invited.

HAMMACHER, SCHLEMMER & COMPANY

HARDWARE, TOOLS AND SUPPLIES

Fourth Avenue and 13th Street New York, Since 1848

Featuring "Morgan" Exterior Design
Craftsman B
Can be made from any kind of wood
Copyright 1914 Morgan

Safe to Specify

Hardwood Doors bearing the famous "MORGAN" trade-mark represent the highest possible attainment in construction and beauty. They are *safe* to specify and install, for they are sure to satisfy. And because

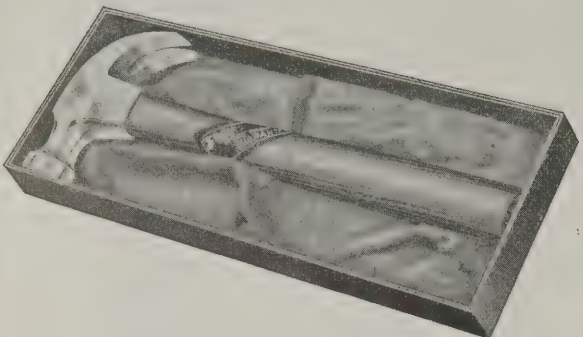
MORGAN DOORS

are sure to *satisfy* they are *sure* to *strengthen* the *success* of architects and contractors who recommend them—for *success* is *founded* on *satisfaction.*

"The Door Beautiful" for 1914 is a handsomely illustrated catalogue and contains complete "Layout" of every door shown in book; also the glass sizes for all sash doors and sidelights. Send for it—it's *FREE.*

MORGAN SASH & DOOR CO.
Dept. C-31, Chicago
FACTORY
Morgan Company, Oshkosh, Wis.
DISTRIBUTED BY
Morgan Millwork Co., Baltimore, Md.
New York Office
6 East 39th St., New York City, N. Y.
Architects see Sweet's Index, pages 972-973.

A Christmas Present Worth Having



The custom of giving useful presents for Christmas is growing every year. A present that will last a long time and will serve as a continual reminder of the giver is the one to select.

A gift of a STANLEY HAMMER, similar to the one illustrated above, would delight every man and boy who has the slightest interest in tools.

This Hammer is made of a special steel, carefully forged, hardened and tempered. The Head is full nickeled—highly finished. The Handle is of selected, second growth hickory—mahoganized, and every Hammer is fully warranted.

Packed in an attractive Christmas box.

PRICE EACH $1.25

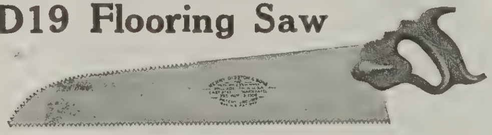
If your Hardware Dealer cannot supply you with this Hammer, we would be glad to send you one, postage prepaid, upon receipt of price.

Address

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

The Easiest Way to Cut Through a Floor

D19 Flooring Saw



The old method of boring holes and chiseling when it was necessary to cut out sections in floors, partitions or ceilings was time-consuming and troublesome.

This work can now be done quicker and easier by the use of our new D 19 Flooring Saw, especially designed for the purpose. Not only is the work done rapidly and with less trouble, but sections cut out with it can be replaced in the original position if desired.

This saw has an adjustable cherry handle, carved and polished, which permits blade to be set in various positions. The blade itself is reversible and interchangeable. It is held firmly in place by patent bolt and ratchet.

Special attention is called to the reversible feature of the blade. In this way either the straight or curved edge of the blade, both of which are toothed, can be used to the best advantage.

Size 16, 18 and 20 inches.

Send for "Hand Saw Booklet"

HENRY DISSTON & SONS
Incorporated
Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, U. S. A.

Extra metal shingle or tile roof. Emphasis is laid upon the patent joint which is used and which permits contraction and expansion from heat and cold without interfering with the weatherproof quality. The simplicity of the joint is said to be such that with the most ordinary tools any workman can lay the tile simply from the printed instructions. The lock is formed on the highest part of the plate, thereby carrying the water away from the seams. The embossed end lap is a distinct feature of the tile and shingles which prevents any moisture working its way up under the overlapping tile to penetrate through the sheathing. We have from the same company a copy of its catalog No. 26 consisting of 216 pages, which relates to its entire line of sheet metal products.

A New Mortising Machine

Many of our readers are likely to be interested in the mortising machine which has been placed upon the market by the National Mortising Machine Company, Springfield, Ohio, and a general view of which in its practical application is presented in Fig. 9 of the engravings. The machine is simple in construction and the arrangement of parts is such that it will cut any size mortise up to 6 in. in length and about 4 in. in depth. It cuts straight in at the top, bottom and sides and the hole is straight on the back. The claim is made that it works equally well in hard as well as in soft timber and will easily cut in three minutes a mortise 3 in. long and 3 in. deep, making it perfect and accurate. It can be adjusted to cut any size of mortise simply by moving two trip pins which requires only a couple of seconds of time. The mortiser is referred to as being automatic in all its workings and the only thing the operator has to do is to furnish the power. The machine has a screw feed which insures an even travel at all times and prevents any jarring or straining of the mortiser. The illustration so clearly indicates the general construction that further comments would seem to be unnecessary as every wide awake and enterprising carpenter and builder will appreciate the advantages of a machine of this kind.

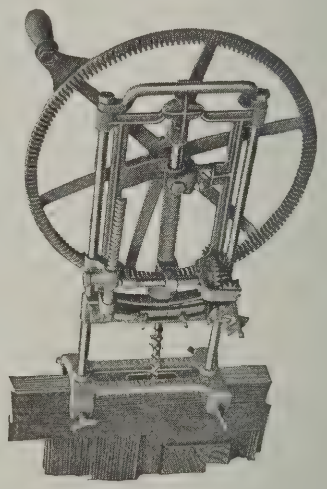
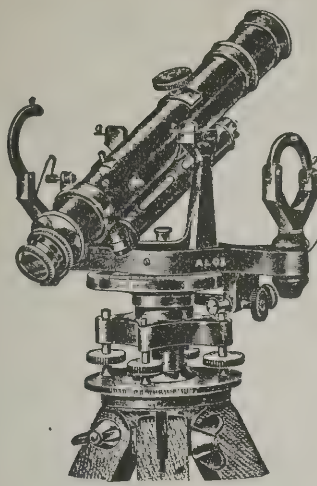


Fig. 9—A New Mortising Machine

Work for the Winter

An extremely valuable and practicable offer of assistance to the carpenter-contractor and the builder in securing orders for new floors for old buildings, to be laid during the winter months when work in regular lines is usually rather slack is presented by the Maple Flooring Manufacturers' Association in this issue. The work in question is intended to serve as a filler-in during the long winter months, and it should not require great effort to start the custom of replacing worn-out softwood floors with substantial hardwood floors. This is a step in the right direction by the manufacturers of maple, beech and birch flooring, and it will be a step in the right direction for carpenters and contractors to confer a benefit on their customers and a profit on

(*Continued on page 78*)



Rent this Level 10 Months Then It's Yours

Builders — Contractors — Architects

This is not the old style Architect's Level. It is the newest model *convertible* level. There is not a single Builder, Contractor or Architect who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder, contractor or architect can use the Convertible Level, sent free on request.

WARNING

The Level we offer is the new Aloe Convertible Level. Don't confuse the Convertible Level with the ordinary style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified transit and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

A. S. Aloe Co., 625 Olive St., St. Louis, Mo.

COUPON

A. S. Aloe Co.,
625 Olive St., St. Louis, Mo.

Please send free instruction book on the use of the Convertible Level and complete details of your rental plan. This request in no way obligates me.

Name ....

Occupation ....

Street ....

City.................... State............

B. A., Oct., '14.

SARGENT

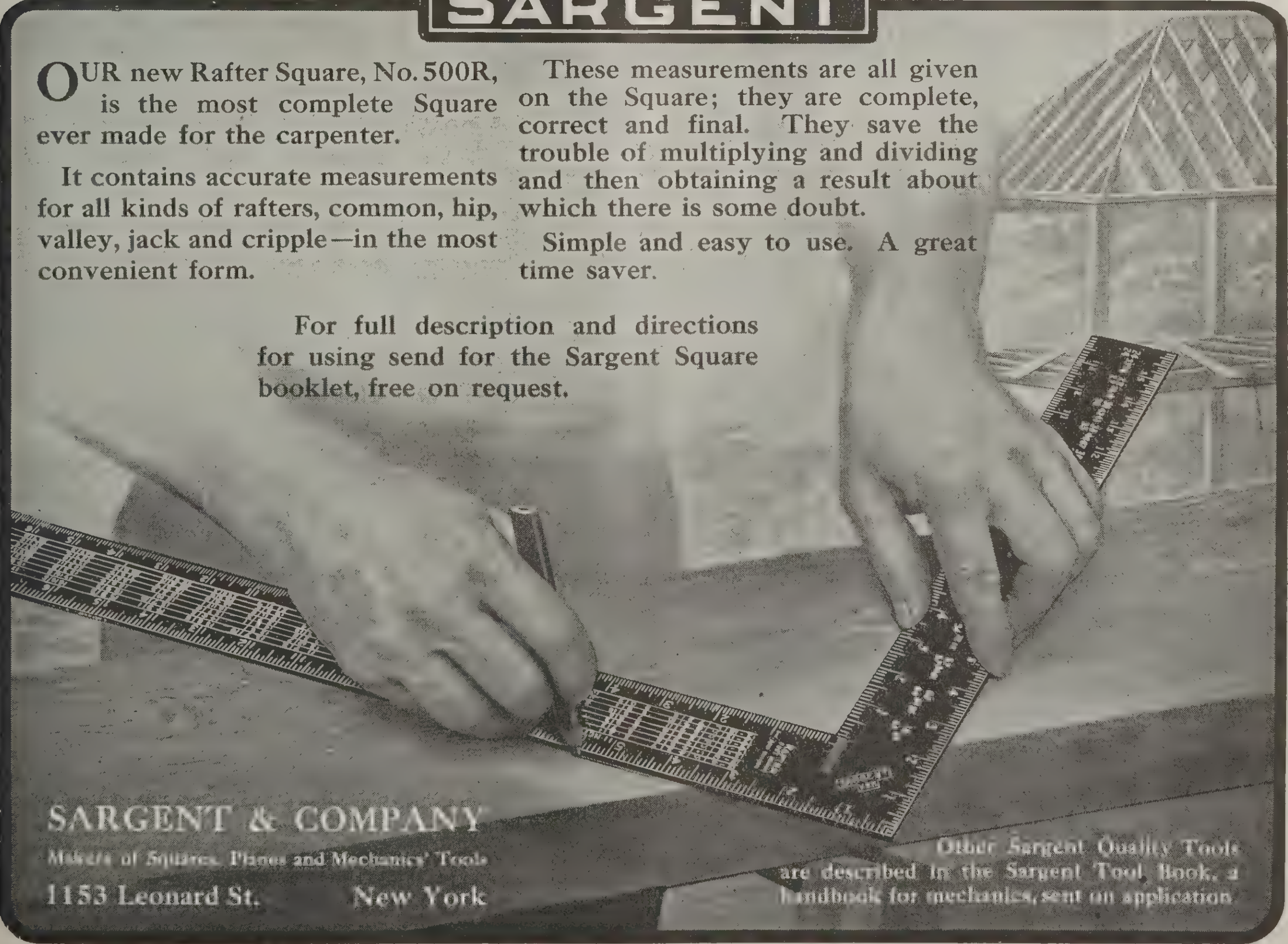
OUR new Rafter Square, No. 500R, is the most complete Square ever made for the carpenter.

It contains accurate measurements for all kinds of rafters, common, hip, valley, jack and cripple—in the most convenient form.

These measurements are all given on the Square; they are complete, correct and final. They save the trouble of multiplying and dividing and then obtaining a result about which there is some doubt.

Simple and easy to use. A great time saver.

For full description and directions for using send for the Sargent Square booklet, free on request.



SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application

Straight Talks
on
Durametal Weatherstrips

¶ You contractors—carpenters and building owners—why not buy weatherstrips direct from the manufacturer and do your own installing?

¶ By our unique plan, we have cut out the usual big selling expenses, which enables you to buy direct from us, make a profit on the strip and good money on the installation besides.

¶ Durametal Weatherstrips have been successfully sold for over 10 years, and have stood every possible test. Their durability and simplicity make them superior to all others.

¶ Made of best heavy zinc, and fully guaranteed. Write for samples and prices now before you turn another page. There's money in this for YOU.

A few agencies open to responsible, live, local contractors and carpenters.

Durametal Weatherstrip Co.
12 East Austin Ave., CHICAGO, ILL.

Sanitary Flush Doors
Fire and Sound Retarding

Best for Hospitals and Schools; unexcelled for Hotels, Offices and Public Buildings; equally well adapted for high-class Residences.

Specifications:

Form cores of Veneered Doors having plain surfaces with narrow strips of sound Chestnut or White Pine, glued, cross-framed and doweled together, with edge strips of same wood as face veneers. Keep cores at proper temperature until glue is set and all surplus moisture evaporated.

Dress Cores to required thickness, with uniform and true surface, and cover both faces with ⅛-inch edge-glued veneers, applied under hydraulic pressure; when thoroughly dry and seasoned, sand and polish to required thickness.

Doors having openings for glass to be framed up and veneered as above specified, with glass moulds mitered around openings.

Specify and insist upon a construction as outlined and you will secure best results.

Hyde-Murphy Co.
Ridgway, Pa.

New York Office: 507 5th Ave.
Pittsburgh Office: 6101 Penn Ave.

themselves by starting a demand for modern floors in their localities. Maple, beech and birch floors are referred to as being sanitary, warm, dry and, above all, are labor-savers to the housewife. Complete information regarding this matter can be secured by any reader of *The Building Age* who will address the Maple Flooring Manufacturers' Association, Stock Exchange Building, Chicago, Ill.

Catalogue of "Classik" Steel Ceilings

The Berger Mfg. Company, Canton, Ohio, has just issued from the press a new catalogue known as No. 19 describing its well-known "Classik" line of steel ceilings. It is handsomely bound and profusely illustrated, and as a matter of fact is something more than a mere catalogue because its 148 pages give valuable information of a general character relative to metal ceiling application as well as interesting particulars of the many points which distinguish the "Classik" line. One of the most striking as well as useful features of the catalogue is found in the many large and beautiful illustrations of unique patterns of "Classik" ceilings, cornices, moldings, etc., while additional interest is provided by the pictures of interiors of banks, theatres, churches and other buildings in which Berger's "Classik" steel ceilings have been installed. The point is made that the company has recently effected a considerable reduction in the cost of erecting its ceilings by the introduction of its new close fitting bead and countersunk self-centering nailing point, which practically eliminate calking of the joints. We understand that a copy of this handsome catalogue will be sent to any reader of *The Building Age* who makes the request on his business stationery.

"Safety First" in Roofing

The progress of the fight against fire during the past few months has been truly remarkable. The slogan of the participants in this fight, "Safety First," is seen everywhere, and since the Salem conflagration it is more noticeable than ever. Non-fireproof roofings especially are being condemned, some persons tearing off comparatively new wooden shingle roofs and applying fireproof materials. Notable among the many instances which come to our notice in this connection is that of the Asheville School, at Asheville, N. C. The building is located high up in the mountains, far removed from any adequate fire apparatus, and a few months ago a fire occurred in one of the smaller buildings. Although very little harm was done, it caused the owners to realize their danger. The wooden shingles on the buildings were comparatively good, but the owners had them torn off and in their place was applied about 40,000 sq. ft. of asbestos "Century" shingles, which is an asbestos cement material claimed to be absolutely fireproof. Another case is that of the Coliseum at Fort Forth, Texas. The State of Texas recently passed a rather strict law concerning fireproof roofings, and the Coliseum, which has a roof area of at least 30,000 sq. ft., is now covered with Asbestos "Century" Shingles. The new Broadway Market at Buffalo, N. Y., a building nearly as large as those mentioned above, has also recently been roofed with these shingles, and indeed almost everywhere one may look buildings are being covered with them. The factors for this material, the Keasbey & Mattison Company, of Ambler, Pa., say that, notwithstanding the peculiar condition of business for the past several months, the sales of Asbestos "Century" Shingles have rapidly increased.

Shelby "Chief" Floor Hinge and Check

A very attractive folder which illustrates and describes in detail the Shelby "Chief" double acting surface floor hinge and check has just been issued by the Shelby Spring Hinge Company, Shelby, Ohio. The device in question is said to put every swinging door under absolute control—not only closing it as slowly or as quickly as may be desired, but bringing it shut and

(*Continued on page* 80)

ADZE! ADZE! ADZE!
For Everyone

Ship—Lipped.

It's a Waste of Time
stopping every little while to grind an adze, and good work cannot be done with a dull tool. One big advantage of our adze is that it stays sharp twice as long. You can do just a half more work. Let us prove it to you.

Ship—Plain.

Send for our Adze Folder showing all of our Adze and Prices

House Carpenter.

It's a Waste of Money
buying a poor quality tool. The man who uses an adze works hard enough without the handicap of having poor tools. WHITE'S cost a few cents more but will last twice as long, so aren't they worth it?

The L. & I. J. WHITE CO., 100 Perry Street, Buffalo, N. Y.

A New Field

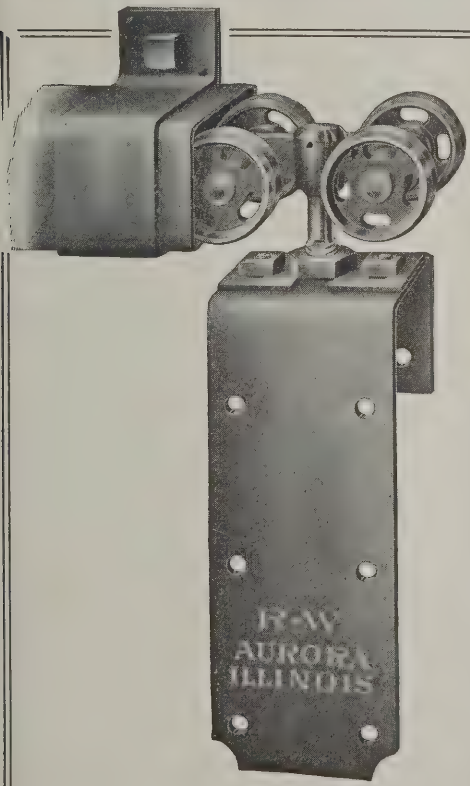
With the multiplication of automobiles, there has come a multiplication of garages. Most car owners have a little garage of their own. A special type of door hanger is usually necessary owing to the large door opening needed and the lack of room for sliding.

R-W
Garage Hangers

Solve this most difficult problem and build up a big business by using R-W Garage Door Hangers.

There may be some door arrangement come up hard to figure out.

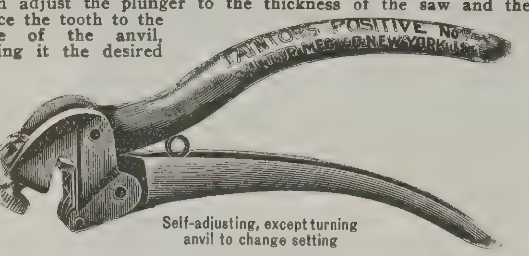
Put it up to us. Send us a rough sketch showing measurements, and we will be glad to tell you what is needed and where to get the hardware.



Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.

DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.



Self-adjusting, except turning anvil to change setting

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.

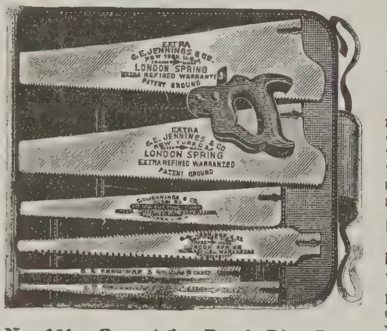
Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., New York

C. E. Jennings Arrow Head Combination Sets of SAWS

Adjustable Handle



No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set In a Box or Leather Case If So ordered Extra.

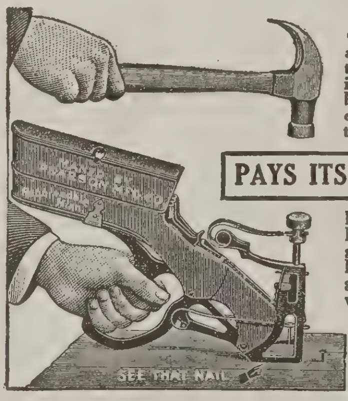
We will send a set by parcel post if your dealer cannot supply you.

Send for circular.

Sole Manf's

C. E. JENNINGS & CO., 71-73 Murray St., New York

Pearson's Automatic Shingle Nailer



Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only $5.00 It makes good.

Pearson Mfg. Co.
Robbinsdale, Minnesota

SEND $1.00 for this

remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending $1.00 for this attractive offer. We prepay postage.

Otis A. Smith Rockfall, Conn.

holding it so until it needs opening again. The construction is very simple, the outfit consisting of a well-built hinge which carries the weight of the door and a liquid door check. The hinge is noiseless and operates on hardened steel ball bearings, thus reducing friction to a minimum. It is supported by a base plate which rests upon the floor but is not mortised into it, this resulting in a great saving of time when installing. The sizes range according to the weight and size of the door on which the device is to be used. It is made with finishing plates of wrought steel, bronze or brass, and these may be had in a variety of finishes to match any style of interior decoration.

In the folder the statement is made that the company has endeavored to cover the ground so fully as to answer every question an architect would be likely to ask if visiting the factory or if one of its representatives was seated in the architect's office. In cases, however, where more detailed information regarding installation will be desirable the company will take pleasure in answering specifically any questions with which architects or builders may favor it.

The Universal Bench Stop

A device which will strongly appeal to the carpenter and the builder is the bench stop which is illustrated in Fig. 10 of the cuts. The device is made of cold rolled steel and is therefore practically indestructible It occupies a space only 3 by 6 inches, weighs a trifle more than a pound, and takes up but little room in the carpenter's tool box. The arrangement of parts is such that it can be readily adjusted and can be utilized for a great variety of purposes. The claim is made that on the side of the bench it can be used to joint and fit doors, sash or lumber; that it is used to equal advantage on a saw horse and can be taken from room to room or can be used on the end of a 2 x 4 piece of stuff or on a one-inch board or plank. The head raises three inches and the post can be dropped down flush with the top of the bench if desired so as not to interfere with material which may be pushed over it. The post is reversible and can be raised or lowered by simply giving the lever at the back a one-sixteenth turn. In order to adjust the stop to a bench or a saw horse it is only necessary to remove the post and tap the dogs on either side with a hammer until they are set up tight. The illustrations presented herewith so clearly indicate the appearance of the bench stop and some of its applications that an extended description would seem to be unnecessary. It is made by the Universal Bench Stop Manufacturing Co., 161 Marion Ave., Pasadena, Cal.

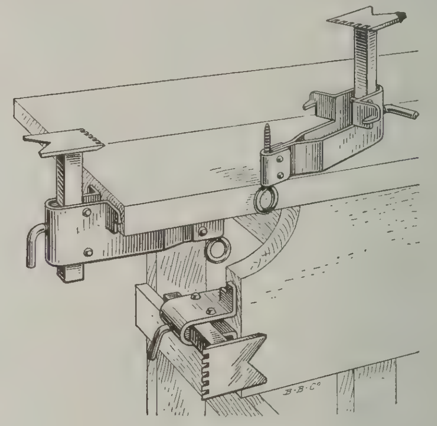


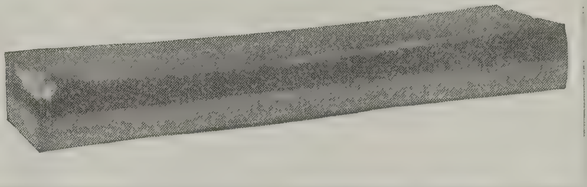
Fig. 10—General View of the Universal Bench Stop

Plumbing and Heating Supplies by Mail

If thirty-five years of continued success in one line of business and in one locality is any sign of stability and progress—and most people will contend that it is—then the John Hardin Co., pioneers in the distribution of plumbing and heating supplies direct to the consumer can be relied upon. For this period the company has been located at 47th street and Cottage Grove avenue, Chicago, Ill., during which time it has dealt exclusively

(*Continued on page* 82)

A Carborundum Stone that has been in Use for Seven Years



SIX days a week for seven years a New England craftsman used this Carborundum Sharpening Stone.

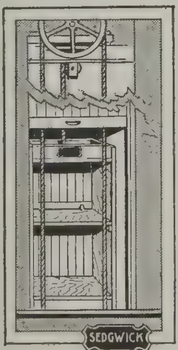
It is still on the job keeping his tools keen and smooth.—It still cuts clean and quick.—There is no sign of glazing, and he says it is good for years to come.

This is a real practical test of the uniformity, durability, and genuine efficiency of Carborundum Sharpening Stones.

There is a Carborundum Stone for every edge tool. Your hardware dealer has them, or order direct.

THE CARBORUNDUM COMPANY
NIAGARA FALLS, N. Y.

Where any
DUMBWAITER
is wanted a
SEDGWICK
is needed



BECAUSE:

First: The SEDGWICK line is so complete that you can select just the size and type of outfit that will exactly meet the requirements of each job.

Second: Each SEDGWICK outfit is superior in Design, Material, Workmanship, and Finish.

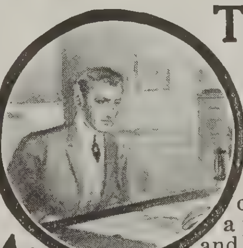
Third: Each SEDGWICK outfit is guaranteed by the makers.

Furnish a SEDGWICK and make a permanent customer.

Catalogue L gives complete descriptions and easiest and best methods of installation. Write for it now.

Sedgwick Machine Works
123 Liberty Street
New York City

This Way to a Bigger Salary!



This great offer is made to practical men who have never had the advantage of a technical training. Here is *your* chance—grasp it. This is not a plan of selling books. The Day and Evening Classes of our old-established Chicago School are filled with men from the building trades. You can get the same work at home on practical working blue print plans. The same experts are *your* instructors.

Chicago Technical College
Study at Home our New, Quick, Easy Plan
BUILDERS' COURSE in Plan Reading, Estimating
Architectural Drawing and General Contracting

$15.00
OUTFIT AND ALL BLUE PRINTS
FREE

We have no books to sell. You don't study from old-time plates in books. You use live, up-to-date blue print plans of buildings now being built. No other correspondence school offers this advantage. Let us tell you more about the "Chicago Tech." method—the new, easy, quick plan. Never mind the cost—it's small. Earnest and ambitious men are the ones we want. "Spare hours are ambition's tools." Use yours. Write.

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CHANCE!
GO AFTER THE BIG JOB

Mark "X" opposite work in which you are interested. Without obligation we will send full information.

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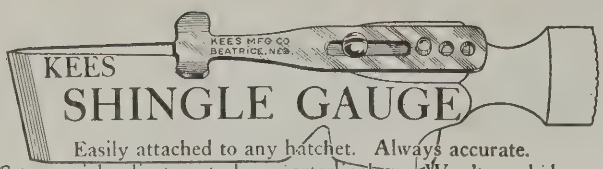
CHICAGO TECHNICAL COLLEGE, 1020 LAKE VIEW BUILDING, CHICAGO, ILLINOIS



KEES
SHINGLE GAUGE

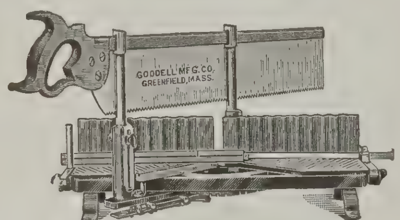
Easily attached to any hatchet. Always accurate.
Seven quick adjustments by quarter-inches. Won't work loose.
Enables you to shingle fast without a helper. Saves using
chalk-line or straight-edge. Made of cold-rolled steel, nickel plated.

Send 15c Stamps or Coin for Sample. Your Money
Back if You Are Not More Than Pleased

F. D. KEES MFG. CO.
BOX 812 BEATRICE, NEB.
MAKERS OF
Kees Metal Building Corners, Siding Clips, Gossett
Storm Sash and Screen Hangers. SAMPLES FREE.

Goodell Mitre Box
Made of STEEL—Cannot Break

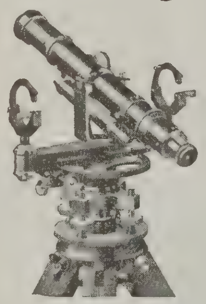
For years this Box has been recognized as being *first in quality and improvements*, and the new STEEL BOTTOM PLATES with ANGULAR SERRATURES to prevent the work from slipping add still more to its convenience and attractiveness.


GOODELL MFG. CO.
GREENFIELD, MASS.

Write for new *Circular K* describing this and many other features.

GOODELL
MFG. CO.
Greenfield, Mass.

"Sterling" Convertible Level



To compete successfully with the up-to-date Builder a reliable **level or transit** is an absolute necessity. In selecting an instrument do not overlook the many advantages to be gained in the purchase of a "Sterling"—accuracy, durability, simplicity—efficiency! Write **today** for details of **Free Trial Offer**, price, terms, etc., of the **instrument you will ultimately select.**

We **Repair** and **Adjust** all makes of instruments, **tape lines, etc.,** and take old transits and levels in exchange.

Warren-Knight Co.
Makers of "Sterling" Transits and Levels
136 N. 12th St. Philadelphia, U. S. A.

RED DEVIL
Leadership

is the result of constant effort to produce a better, more serviceable and handsomer tool. This is shown in the latest design of scientific shape handle that conforms to the variations of the human hand, thus giving a largely increased leverage and less fatigue to the fingers.

RED DEVIL No. 655
Red Devil Tools can be obtained at most reliable dealers. If your dealer has none, send 90 cents for a sample 655, in convenient 5½ in. size. This has a long nose that permits use in close places, a hand honed side cutter, highly polished head, and handles of the latest scientific design, with beautiful dentyne milling that assures a perfect grip.

The best material, the best workmanship, the most rigid inspection can have only one result—the best tool.
That's Red Devil.
Send for your copy of booklet, 3000 Red Devils.

SMITH & HEMENWAY CO.
158 Chambers Street New York City

in plumbing and heating supplies. The progress that has been made and the extensive and complete line stocked has prompted the company to issue catalog No. 81, containing 232 pages of interesting matter and all profusely illustrated. Everything in plumbing and steam fitting materials is covered, and six pages are given over to the index. The company calls particular attention to the fact that its goods are guaranteed exactly as represented. Interested readers will receive one of these handsome catalogs by writing the company at the given address.

New Surface on Neponset Paroid Roofing

With a view to further enhancing the appearance and durability of its Neponset Paroid roofing, Bird & Son, East Walpole, Mass., has just succeeded in improving the final surface, making it a lighter gray than formerly. The claim is made that in its present state it will last years longer than the old style surfacing. This particular form of roofing is well adapted for use on farm, factory and railroad buildings of the better sort and has received the endorsement of leading railroads of the country as well as of the United States Government, which annually uses large quantities of it. In connection with the construction work at the Panama Canal it has used more than 1,500,000 sq. ft. and it has just placed another large order for more of it to be used in the Canal Zone. This roofing is of high quality and has maintained a place in the front ranks ever since it was introduced to the trade more than 15 years ago. The manufacturers' roofing experts are working all the time to make the material more durable than ever, and as a result of their efforts the improvement noted in the final surface of the roofing has been brought about. We understand that samples of the new material will be sent to interested architects and builders on application to the address above given.

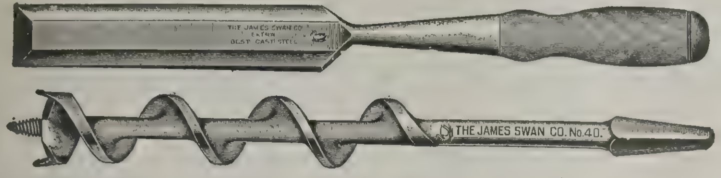
"Paradux" Canvas-Roof Covering

Flintkote Mfg. Company, 98 Pearl Street, Boston, Mass., is distributing some very interesting literature setting forth the merits of its "Paradux" Canvas-Roof Covering, which is referred to as being especially adapted for covering piazza roofs, balcony floors, decks, bay window roofs, etc. It is composed of a layer of strong long-fibered felt which has been thoroughly saturated with a non-drying water-proof compound and then coated on the top and bottom side with the company's special water-proof and fire-resisting gums. To the surface of this sheet of water-proof felt is affixed a strong layer of canvas. Paradux is laid with the canvas side up and is then painted. It is 36 in. wide and put up in rolls 72 ft. long, each roll containing 216 sq. ft. of roofing. What is known as "Special Paradux" is for covering roofs on which continual walking is done. This has a heavy duck facing and a strong rubbery compound applied directly to the back of the duck.

The Sal-Mo Slate Shingles

A form of slate shingle likely to attract more than passing attention on the part of architects and builders more especially in view of the consideration now being given to roof coverings is the "Sal-Mo," made of a high grade of roofing felt which is deeply saturated with a high melting point natural bitumen asphalt. Finally a heavy surface coating of granulated slate or granite is applied by a special process to make the shingles weather-resisting. The natural color of the crushed rock makes them pleasing in appearance and their qualities for wear are guaranteed for twelve years, by the makers, the Sall Mountain Co., 230 South LaSalle street, Chicago, Ill. The "Reliance" roofing made by the same concern is basicly produced from the same felt materials, which after being saturated in the bitumen asphalt, free from oil, is finished with a coating of bitumen asphalt and mineral rubber. While the coating is still hot a surface of sparkling white mica is imbedded in it, giving the roofing a double

(Continued on page 84)

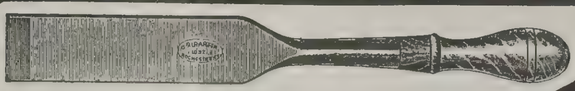

THE JAMES SWAN CO. EXTRA CAST STEEL
THE JAMES SWAN CO. No.40.

LOOK FOR THE "SWAN" TRADE MARK

On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.

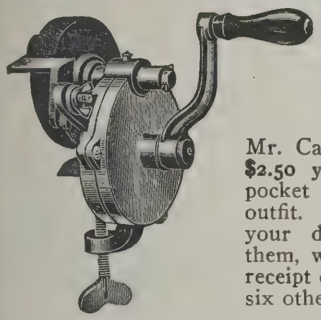


MACK & CO.

The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

D. R. BARTON 1832 ROCHESTER N.Y.

Brown's Race
Rochester, N.Y.

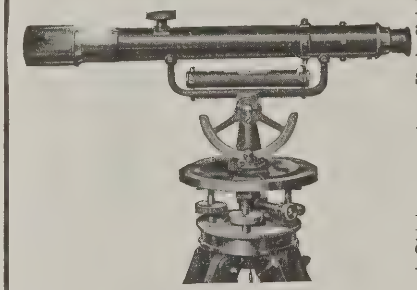


No. 0 PERFECTION

Our vest pocket edition for Carpenters, Plumbers and households; fitted with 4-inch Corundum Wheel. Weight 5 lbs.

Mr. Carpenter, just think for $2.50 you can carry in your pocket a complete sharpening outfit. No dirt—no grease. If your dealer does not carry them, we will send prepaid on receipt of price. We also make six other sizes.

STAR SPECIALTY MFG. CO.
227-233 W. Erie St., Chicago



The Yankee (A Compound Level)

Just the thing for the Arch.-Builder
An accurate level for moderate cost

Runs Horizontal and Vertical Angles.

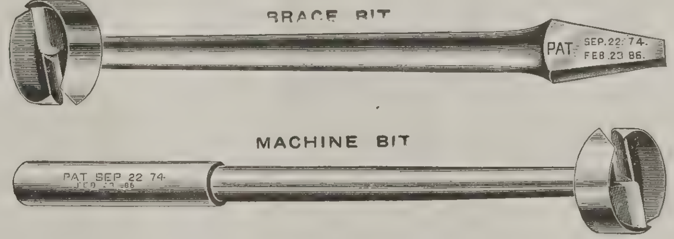
Sold guaranteed by

Frost-Adams Co.
37 Cornhill, Boston, Mass.

Write for our catalogue of books for Carpenters, Builders, Architects, etc.

THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.


BRACE BIT
PAT. SEP. 22 74. FEB. 23 86.
MACHINE BIT
PAT. SEP. 22 74.

Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

Reynolds Asphalt Shingles

ENDORSED BY LEADING ARCHITECTS

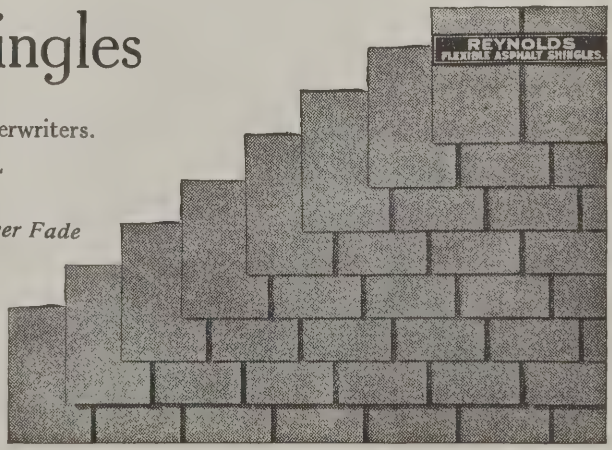
Fire Resisting—Approved by National Board of Underwriters.

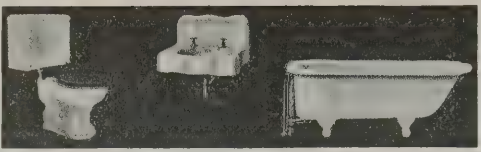
GUARANTEED FOR 10 YEARS—WILL LAST MANY YEARS LONGER

Natural Colors of Garnet, Red, Gray and Green, which Never Fade

We are the ORIGINAL MAKERS of Flexible Asphalt Shingles and tested our product for ten years before putting it on the market. Let us send you a booklet.

H. M. Reynolds Asphalt Shingle Co.
West Grant Street, Grand Rapids, Mich.
Established 1868





EVERYTHING in Guaranteed Plumbing and Heating Supplies
at wholesale; Our $200,000 establishment behind our GUARANTEE
Send for complete CATALOG 81
J. HARDIN CO., 35 yrs. at 47th & Cottage Grove Ave., Chicago

THE IDEAL WAY TO BUILD
Use a Van Guilder Hollow Wall Concrete Machine
It builds double monolithic walls tied together and steel reinforced. Continuous air space, dry, warm, sanitary, fire proof, age proof, repair proof.
Better than brick, cheaper than wood.
Large illustrated Catalogue and Book "How to Build" free.
VAN GUILDER HOLLOW WALL CO.
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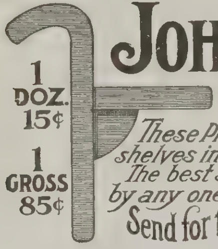


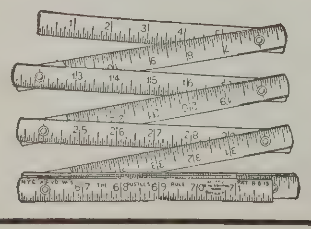
JOHNSTON'S *Patent* SHELF PIN
1 DOZ. 15¢
1 GROSS 85¢
These Pins are used for supporting movable shelves in Book Cases. Cannot fall out or sag down. The best shelf pin made. Easily put in place by any one.
Send for free sample to J. D. JOHNSTON, NEWPORT, R. I.

YOUNG MEN
Prepare for
Good Positions in Carpentry and Building
Begin now. Nine months course. Low Expenses.
For Illustrated Circular, Address
PRATT INSTITUTE, Dept. G., **Brooklyn, N.Y.**

Turn Your Spare Time Into Cash
Become our local representative. Sell and install Kees Automatic Furnace Regulators.
This is a splendid opportunity for one live carpenter in each town. Drop us a card today.
F. D. KEES MFG. CO. BEATRICE, NEB. Box 812

$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)
ABSOLUTELY SAFE for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.
Write for Catalogue of Builders' Specialties
THE TAYLOR STEEL SCAFFOLD BRACKET
JAMES L. TAYLOR MFG. CO.
POUGHKEEPSIE, N. Y.

STOP THOSE RATTLING WINDOWS
Do away with sash weights, cords, pulleys and pocket frames and save money by using
AUTOMATIC SASH HOLDERS
Proved by Use—Unexcelled for windows without pocket frames. Excellent for new windows.
Send for circular and prices, or $1.00 for trial set prepaid; state approximate weight of sash.
AUTOMATIC SASH HOLDER MFG. CO., Church St., New York.



THE RUSTLESS RULE
Made of Luminoy. Will not rust. Large Figures. Accurate graduation. Perfect joints. Light weight. Strong. Durable, Lasts a lifetime.
2 ft..50c 3 ft..75c 4 ft..$1.00
5 ft....$1.25 6 ft....$1.50
Delivered to your door at these prices.
JOSEPH WOODWELL CO.
201 Wood St., Pittsburg, Pa.

shield against the weather and affording a fire-resisting surface. The rolls for 100 sq.ft. of roofing surface are supplied with an additional 8 ft. for laps, etc., each roll being complete with asphalt lap cement, broad-headed nails and illustrated directions for laying. The company manufactures a variety of asbestos products which includes a roofing of pure asbestos on "Reliance" rubber roofing. Full particulars are contained in a 48-page catalog which has just been issued.

Two New "Red Devil" Glass Cutters

The Smith & Hemenway Company, 158 Chambers Street, New York City, has just added to its extensive line of "Red Devil" tools the circular glass cutters illustrated in Figs. 11 and 12 of the cuts. The tool shown in Fig. 11 is of such a nature that it will cut circles from two inches to 20 inches in diameter, while a larger size that the company can supply will cut circles up to 40 inches. The illustration affords an excellent idea of this cutter which is simple but very effective.

Two New "Red Devil" Glass Cutters—Fig. 11—View of Cutter No. 033

In order to meet the demand for a better tool of this class the company is offering the circular cutter known as style 263, shown in Fig. 12 of the cuts. This has hand-honed wheels which it is said will cut sharp clean circles ranging from two to 22 inches in diameter. The strong metal base upon which the cutter revolves is lined with rubber to prevent slipping and the point is made that no unusual skill is required to cut perfect circles with this tool. The increasing use of automobiles and motor trucks by contracting builders will render the little tool very convenient in cutting the circular glass lights required for the head-lamps.

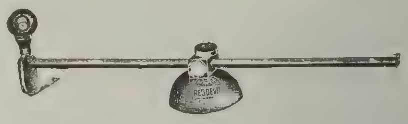


Fig. 12—General View of Glass Cutter No. 263

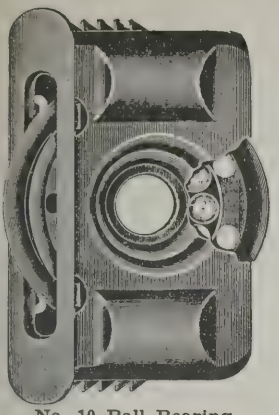
TRADE NOTES

The Carborundum Company, Niagara Falls, N. Y., was one of the exhibitors at the recent Foundry and Machine Exposition held in Chicago, Ill., the company having a most attractive booth in which its products were shown in various forms for different uses. Photographs clearly indicated the various processes of manufacture and interesting literature was distributed to visitors. Among this literature was a vest-pocket novel, entitled "The Romance of Carborundum."

We are advised that the Auld & Conger Company, Cleveland, Ohio, has just made a shipment of its product to the Pacific Coast by way of the Panama Canal. The slate went from the company's quarries at Poultney, Vermont, where is produced its celebrated Mammoth Vein Poultney Sea Green Slate.

One of the many exhibitors displaying materials of interest to readers of *The Building Age* at the recent Foundry and Machine Exhibit held at the International Amphitheater in Chicago, Ill., was the Blystone Mfg. Company, of Cambridge Springs, Pa. This concern made a display of two of its batch mixers, the patented

(*Continued on page 86*)



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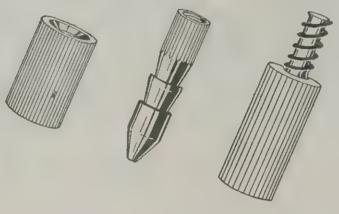

You owe it to yourself to get acquainted with this new and interesting invention. We can't tell you about it here. Send for a sample and make your own demonstration. Sample is free and you are under no obligations to buy. We want you to see Stine Screw Holes. You will do the rest. Send today.

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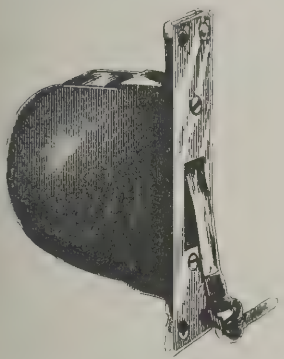

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Makes sashes work perfectly.

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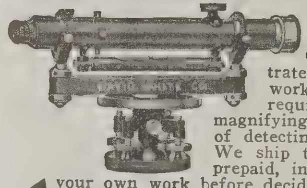

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Something For You

in our Pamphlet 29; viz: Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and a Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

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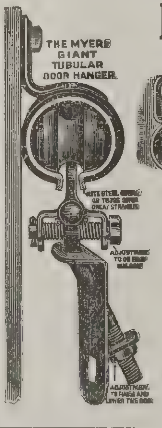
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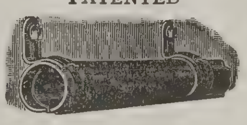

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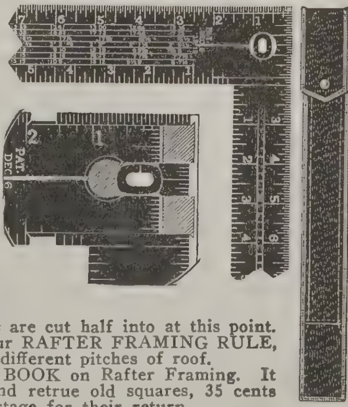

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Strength where tongue joins on to body. All other Take Down Squares are cut half into at this point. These are stamped with our RAFTER FRAMING RULE, giving cuts for seventeen different pitches of roof.

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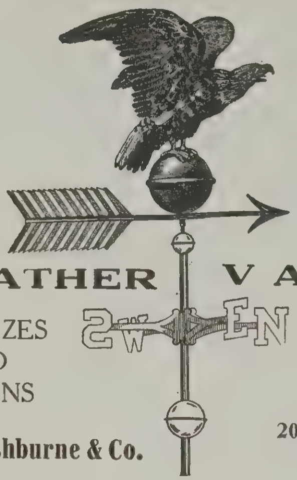

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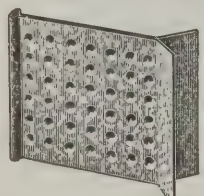

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Sash Pulleys, Sash Chain, Sash Fixtures
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when you buy them
ONE NAIL in Place of FOUR
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Demand Simplex nails from your hardware dealer.

Don't buy prepared roofing unless Simplex nails are packed in the rolls.

FREE Samples sent on receipt of request accompanied by dealer's name.

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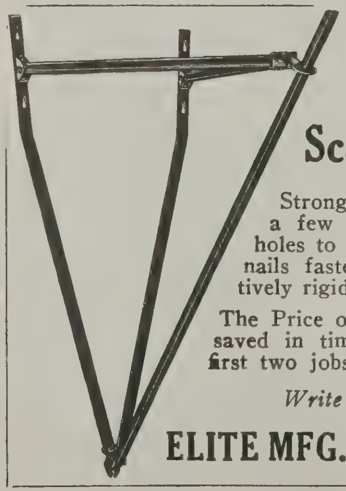

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The Price of these Brackets can be saved in time and material on the first two jobs.

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features of which include among others the reverse spiral shovel system of mixing.

The Berger Mfg. Company, Canton, Ohio, announces the death of its treasurer and purchasing agent, Frank A. Schwertner, at his home in Canton, Ohio.

The striking feature of the September issue of "Graphite," regularly sent out in the interests of graphite productions by the Joseph Dixon Crucible Company, Jersey City, N. J., is the picture on the front page, which represents a young lady sharpening a Dixon pencil with her husband's razor. Her comment, "I'm so glad Jack had it sharpened," together with the shavings which are seen falling to the floor, indicate that the razor is in good condition for sharpening pencils, but "Jack" will doubtless shudder when he attempts to shave with it. The reading pages of the issue in question are replete with interesting information bearing on graphite productions.

F. P. Ramey, Citronelle, Ala., is desirous of securing manufacturers' catalogues of mill work and of other building materials.

Hollow Fire Clay Tile is the subject of a neat little folder which is being sent out by Evans & Howard Fire Brick Company, 920 Market street, St. Louis, Mo. The hollow partition and building tile are deeply scored for plastering and are made in a variety of sizes especially adapted to meet the requirements of the trade. A house built of hollow fire clay tile is referred to as being moisture, sound and vermin proof, also warmer in winter and cooler in summer.

Remington & Rudolph, architects, announce the opening of offices for the practice of their profession at 504 Lyric Building, Richmond, Va., and desire to receive copies of manufacturers' catalogues and samples.

The feature of the September issue of "DooR-Ways," which is the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill., is an account of the picnic of the employees of the company, reference to which was made in our last issue. The story is illustrated by means of numerous half-tone illustrations, one representing the winning baseball team; another, the final heat in the tug-o'-war; a third, the capture of the greased pig; a fourth, the start in the office girls' race; a fifth, the three-legged race, and the last one, the young married women's race. Other pages are given up to door hangers which are the company's specialty.

Bird & Son, East Walpole, Mass., is distributing a folder carrying specifications for Neponset waterproof building papers. In one case the specifications cover the general use of waterproof paper, in another they are intended for use where the finest work is required and in a third case they relate to the use of Neponset Florian sound-deadening felt. The illustrations include a very few of the many buildings in which the company's papers have been used.

The Lehon Company, Chicago, Ill., made an interesting display of specimens of its roofing, insulating paper and waterproof paint at the recent Foundry and Machine Exhibition held at the International Amphitheater in Chicago, Ill.

We are in receipt of an advance copy of a "Report On the Training Class for Trade Teachers at Pratt Institute, 1913-1914," the original of which has been prepared at the request of the United States Commissioner of Education and will be published in substance in a comprehensive report on this subject soon to be issued by the United States Bureau of Education. The class in question consisted of 17 men who were working at various trades during the day and were brought together in an evening class to receive instruction in the principles of teaching as applied to the industrial school. The class met three times a week for a period of 24 weeks, each session being two hours in length. The training given consisted of two parts, the first being practice teaching in the New York evening trade schools one evening each week, and the second being class work at Pratt Institute two evenings each week.

THE BUILDING AGE

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Ask for estimates and Colored Floor Plates

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The Building Age picks out well-built and well-designed houses for its illustrations, and they almost always find that these houses have been stained with Cabot's Stains.

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Made of extra quality stock, carefully inspected and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.

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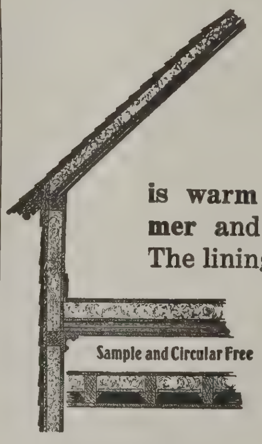

is warm in winter, cool in summer and is thoroughly deafened. The lining is vermin proof; Mineral wool checks the spread of fire and keeps out dampness.

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This Much Is Admitted

Then

There are times when the work of the contractor and builder is slack, when building operations cease almost entirely.

This is peculiarly true in the smaller towns.

It is a wise man who has a side-line for fall and winter, the time when contracting work is dead. What does fall and winter suggest? Dark nights?

Then a lighting plant is the thing to sell.

The Davis Generator has been proven out through fifteen years' use to be efficient, economical and to give satisfaction.

Made by a reliable, well-rated ACETYLENE company.

The generator that is easiest to sell.

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HESS SANITARY MEDICINE CABINET LOCKER

The Only Modern, Sanitary
STEEL Medicine Cabinet
or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

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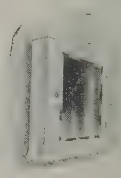


The Outside Steel Cabinet

HESS, 1201-L Tacoma Building, CHICAGO
Makers of Steel Furnaces. Free Booklet

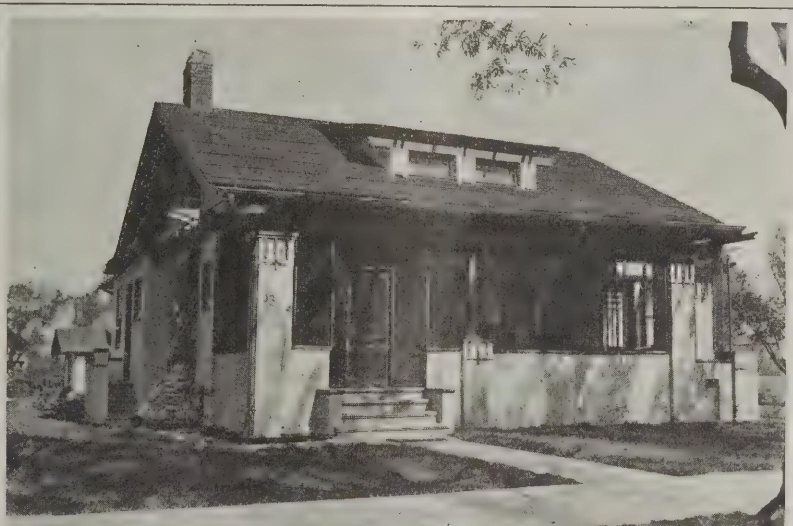
THE BUILDING AGE

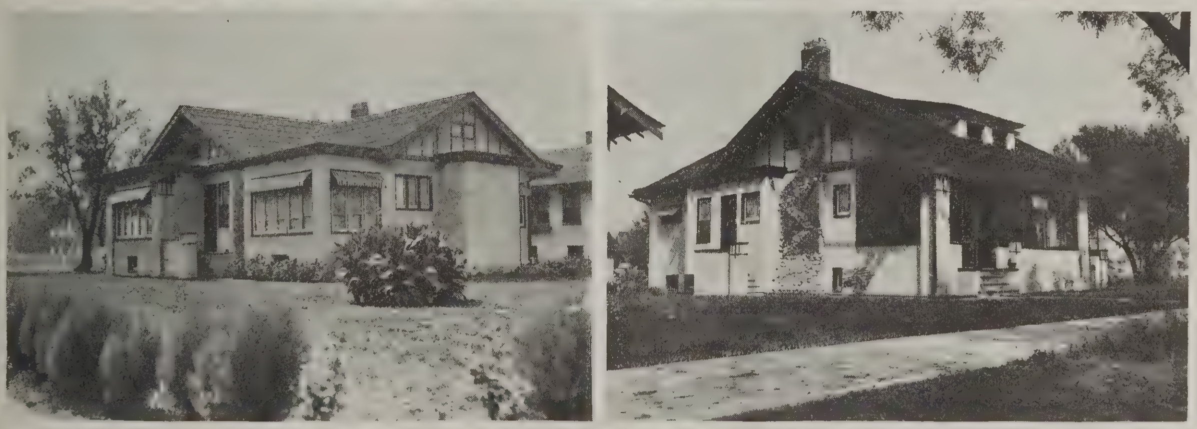
NEW YORK, NOVEMBER, 1914

The Cottage of a Chicago Builder

A Design Which Involves Many Features of Interest to the Practical Man—Cost About $5500

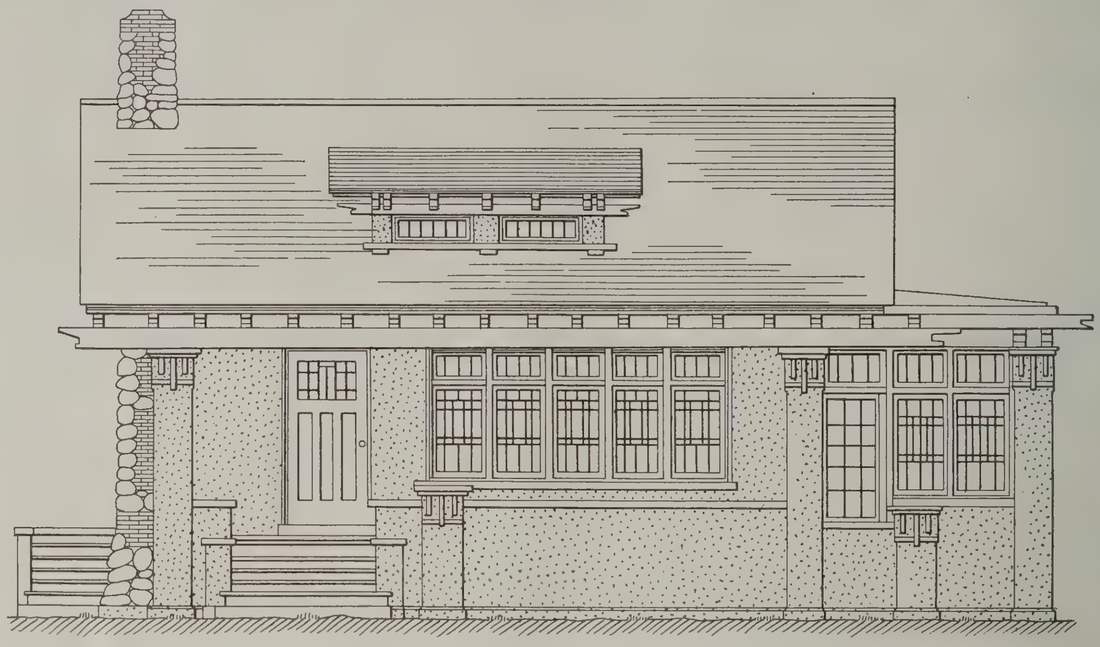
DOUBTLESS the thought often arises in the mind of the average reader looking over the pages of *The Building Age*, What sort of a house would a practical builder erect for himself? In seeking an answer it must constantly be borne in mind that there is a wide diversity of requirements and what would meet the individual tastes and needs of one family would be altogether inadequate in the case of another. Some would be satisfied with nothing less than a pretentious mansion with rooms in profusion, while another would find greater contentment in a home of the cozy-cottage type of architecture finished in good taste and involving an expenditure which would be modest in comparison with the first named. Such a dwelling would perhaps fail in its external appearance to carry a full appreciation of its cost, but interiorly it would appeal to the true lover of the home by reason of its finish, its equipment and the general harmony of the treatment. A very good example of what a general building contractor considers a model home of moderate cost and suitable for housing a small family is illustrated herewith. It was recently erected in Chicago Lawn, a suburb situated about 8 miles from the business center of



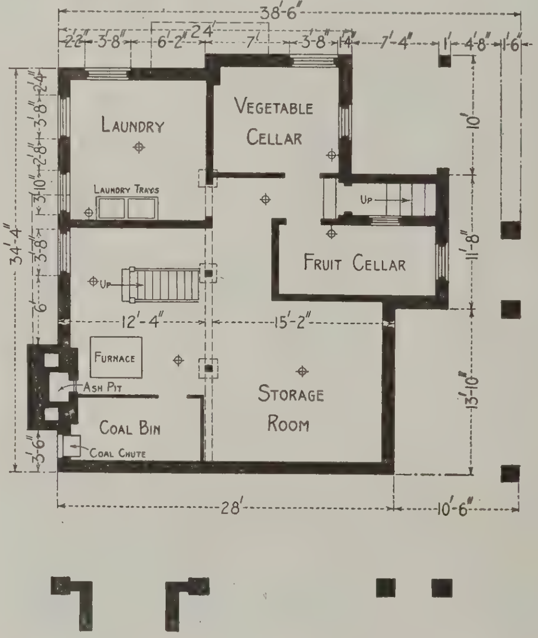


The Cottage of a Chicago Builder—Appearance of the House as Viewed from Different Angles. W. K. Johnston, Architect, Chicago, Ill.

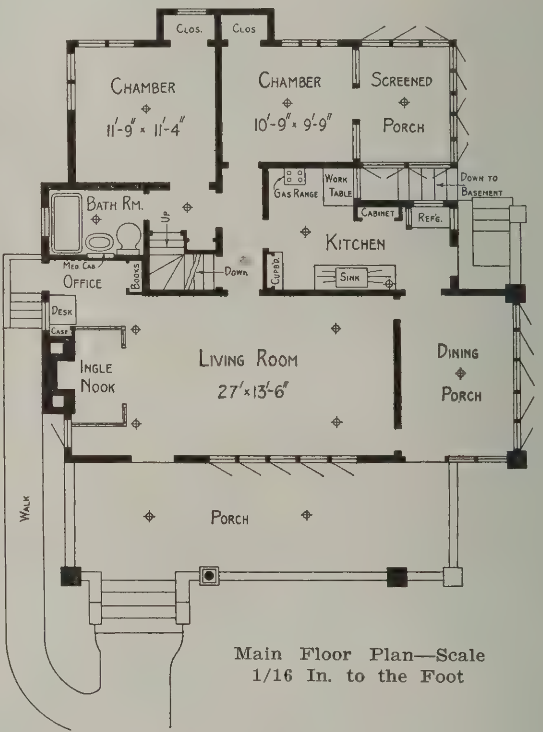
Chicago by a general contractor for his own occupancy, the contractor in question having specialized for many years in erecting dwellings and bungalows of the cozy-cottage type and of moderate cost in suburban localities. The building, it will be observed from the various half-tone illustrations accompanying the article, is distinctly novel both as regards its exterior treatment and in the layout of the main floor. The pergola effect of the porch roof, the stucco exterior and the rustic chimney in the end gable all tend to produce results which cannot fail to attract the attention of the observing architect and builder. The effect is still further enhanced by the color contrasts, the pergola being dark brown, the shingles of the roof a dark green, the chimney stack of brick red and the stucco a grayish tint. An idea of the treatment of the chimney stack may be gained from an inspection of the small picture on the facing page.



Front Elevation—Scale ⅛ In. to the Foot



Foundation—Scale 1/16 In. to the Foot

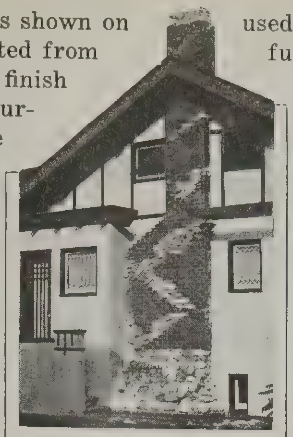


Main Floor Plan—Scale 1/16 In. to the Foot

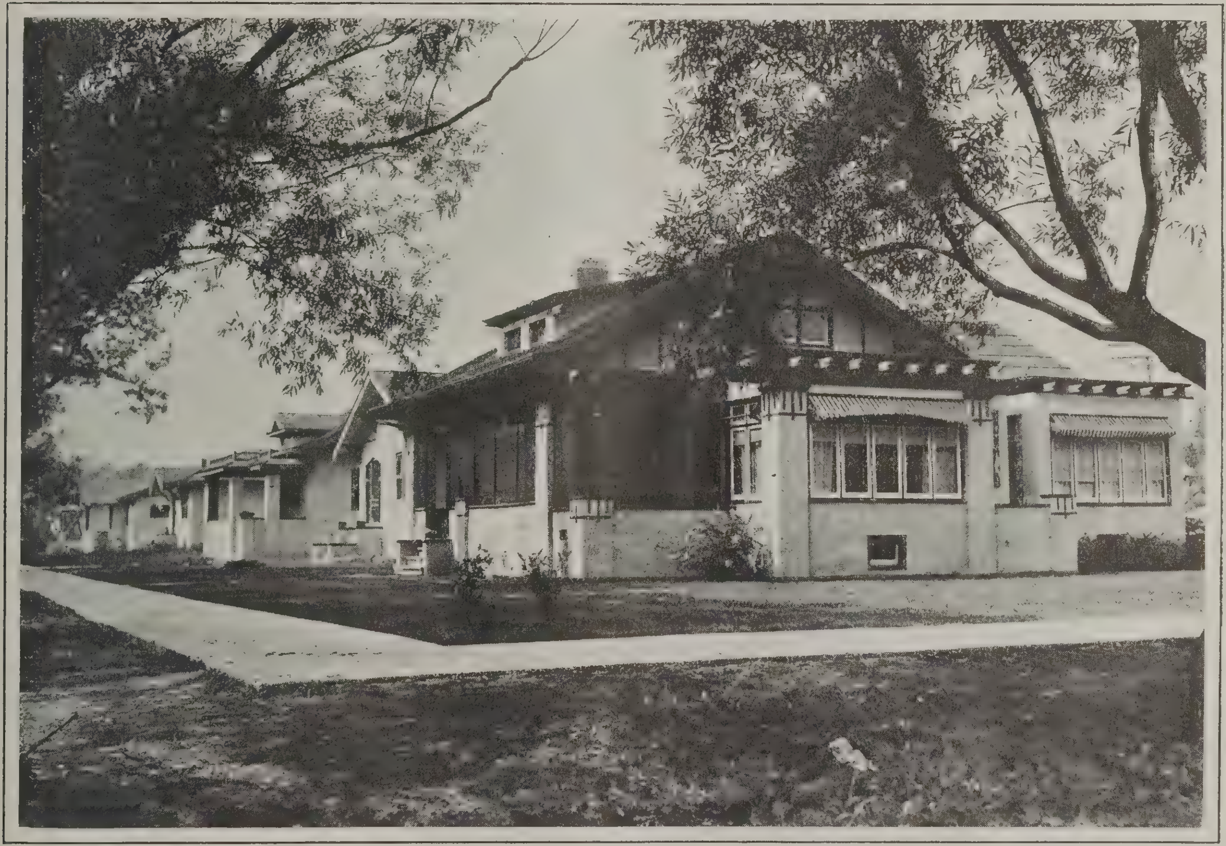
The Cottage of a Chicago Builder—Plans and Elevation—W. K. Johnston, Architect

Another feature which will appeal to many is the porch extending across the front of the house and having an area of 32 ft. in length by 10 ft. in width.

From the front porch the visitor may directly enter either the dining porch or the living room which measures 27 x 13½ ft. in area. At one end is an open fireplace flanked on either side by high windows. A view of this end of the living room is shown in one of the pictures accompanying this article. One corner of the living room is given over for use as the office of the builder and is provided with a desk and a case of books as shown on the plans. The living room is well lighted from the east, west and south sides and the finish and furnishings are in accord with the surroundings. At the extreme right on the plan is shown the dining porch which extends some 4 ft. beyond the side of the building and has direct communication with the kitchen. The latter is provided with all the necessary adjuncts of a well-equipped culinary department, the cooking being done on a gas range so placed as to be well lighted by the window over the work table. The refrigerator is placed convenient to the side entrance and in a position to receive ample light.


Detail of Rustic Chimney and Entrance to Office

At the rear of the house are two sleeping rooms out of one of which opens a screened porch which may also be used for sleeping purposes. The communication between the bedrooms and living room is by means of a short hall or passageway out of which also opens the kitchen on one side and gives access to the bathroom on the other. From this hall one may reach the basement by means of a flight of stairs starting at a point just beyond the living room, while from a point near the bath room door rise the stairs leading to the attic.


The Cottage of a Chicago Builder—A Street View Showing the Contractor's House in the Foreground

The foundation walls are of concrete, composed of a mixture of one part cement, three parts of torpedo sand and five parts crushed stone. The basement floor, 4 in. thick, is composed of the same mixture, beneath which is a layer of cinders.

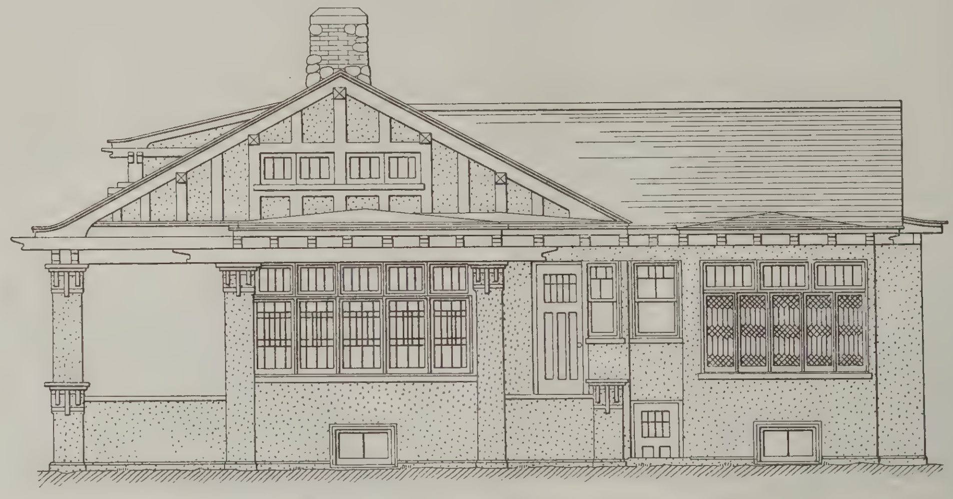
The framework of the building is of hemlock, excepting the woodwork used in the pergola effects, which is of white pine. One layer of tar paper is used over the framing and on top of that furring strips are placed and then 1 in. white pine lath. "Medusa" waterproofed Portland cement, made by the Sandusky Portland Cement Company, Sandusky, Ohio, is used for the "dash coat."

The floors throughout the building are double, one layer of waterproof paper being used between. The floor timbers are 2 x 10 in.; the rafters are 2 x 6 in. and the inside studs are 2 x 6 in., placed 16 in. on centers. The shingles are of white cedar, stock size, exposed $4\frac{1}{2}$ in. to the weather. Each sixth course is double, and before laying the shingles were dipped in Cabot's green creosote stain.

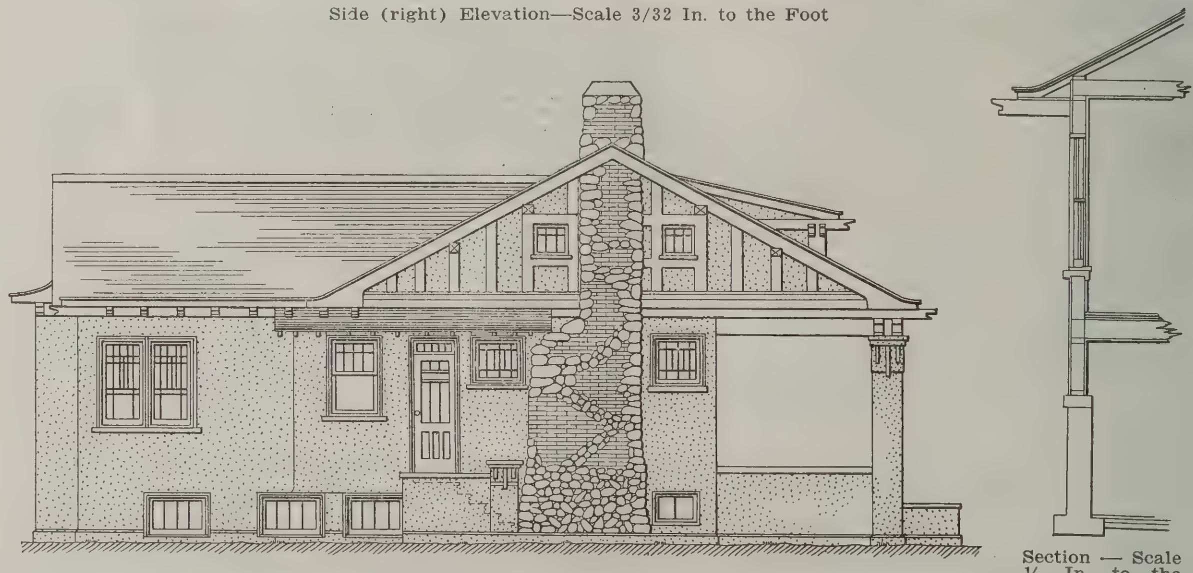
The interior trim of the living room is of $\frac{1}{4}$ in. sawed oak veneer, a conspicuous feature being the baseboard which is 18 in. deep. The open fireplace is of Tapestry brick laid with sunken joints. A neat tiled floor in front gives a pleasing and finished effect. The walls are hung with imported imitation Japanese grass cloth, a stenciled band around the top meeting the wood cornice at the ceiling. The panel effect in the ceiling is used to advantage by having an electric light at each corner, while two clusters of electric lights with shades of white sawed oak provide sufficient artificial light and are in harmony with the general trim.

All doors are $1\frac{3}{4}$ in. thick, the front entrances being of the Craftsmen type, with beveled plate glass, showing wood bars at the top. The inside doors are of one panel veneer. Crystal knobs are used throughout. All hardware is of dull brass.

The windows also form one of the unusual features of the house. The outside casement windows are set with leaded glass, while the tops open as transoms. A framework, as seen in one of the pictures, has been fixed so that the windows, when opened at the top, may be held in place, so that the awning may be pulled down and the room shaded.



Side (right) Elevation—Scale 3/32 In. to the Foot



Side (left) Elevation—Scale 3/32 In. to the Foot

Section — Scale ⅛ In. to the Foot

The Cottage of a Chicago Builder—Elevations and Section—W. K. Johnston, Architect

The bath room is equipped with up-to-date sanitary fixtures of a porcelain type made by the Republic Manufacturing Company, Chicago, Ill. The floor is finished with inlaid linoleum and white tile walls 5 ft. high are provided. Above the 5 ft. mark the walls are plastered and tinted a robin's egg blue. All plastering is of two-coat work, and all painting three-coat work. Combination electric light and gas fixtures are securely fixed each side of a large medicine cabinet.

The two bedrooms are divided by a wall 1 ft. thick. Imbedded in this wall are two large wardrobes, one for each room. The make is red gum veneer, which is very handsome with the Circassian walnut furniture. The room leading to the sleeping porch is used for a dressing room. There is no provision for heating the sleeping porch, but in case of extreme cold the intervening doors can be left open in order to get heat from the dressing room. The sleeping porch is surrounded entirely by large windows, while large shades have been provided in order to ensure privacy.

The basement arrangements are as shown on the plan, the laundry trays having three sections of a heavy lead type. The bungalow is heated throughout by a hot water boiler of the Arco type, manufactured by the American Radiator Company, Chicago. All radiators are finished in bronze, the majority of them being of the low type so that they may be fitted beneath the high windows that are noticeable in the living and dining rooms.

At the rear of the lot is a frame garage 12 x 18 ft. in plan and a view of which is shown in one of the smaller pictures. The wood used is white pine, while the roofing and painted effects harmonize with those on the bungalow. A cement floor has been provided with a center drain, the whole structure being electrically lighted.

The cottage is owned and was erected by W. D. Shoupe, Sixty-fourth Place and Spaulding Avenue, Chicago, Ill., from plans prepared by W. K. Johnston, architect, 6805 Yale Avenue, Chicago, Ill. The cost was about $5,400.

View in Bedroom Used as a Dressing Room with Sleeping Porch at the Right

Ways and Means in the Contracting Business

Contracting is something more than building for profit. It has to do with other things than merely buying material and labor, selling them to the owner and pocketing the cash. At the same time the contractor is building for his customer, he is building for himself. He is erecting the ramparts of his own reputation—those bulwarks which protect and conserve his business career if he builds well, but crumble to dust when he builds weakly. Every job the contractor undertakes is a cry for or against his business. Every sweep of the trowel, every tap of the hammer, brings about results, good or bad, for the contractor.

The Garage, Showing the Car at the Door

It makes no difference whether the work is done by the builder himself or his employees, he is the one who must stand for it; employees are considered as agents of the contractor. He must stand or fall by the character of their work. Then it behooves the contractor to watch his work, not only that it may be done at least expense, but that it shall stand as a monument to his skill—a mark of the efficiency of his force.

Ways and means for expanding a contracting business are unlimited. Given a town of moderate size, where work is reasonably plentiful, who gets the jobs? In a live town there is always about so much to do every year; so many buildings, such a number of houses, and the contractor who gets the lion's share is he who, standing firmly upon past reputation, shows his fitness to do the work; his skill is well known, his price is right, because of the efficiency of his organization. Low prices do not necessarily mean poor work, says Charles White, Jr., in *Building Progress*, and the contractor who thinks his competitor who underbids him is a "cheap skate" may be way off in his estimate of his character. The difference between the high bid and the low bid is often merely the difference in efficiency or organization. The low man may be a live wire; his excellent credit may enable him to buy materials at lower cost—his handling of his men and reputation for fairness toward them may secure increased efficiency from his working force. All these points are translated into dollars and cents in his bid, for they make it possible for the efficient builder to pare down expenses to a point below his less skilful competitor.

The building equipment of many builders is practically nothing. Some knowledge of building obtained during their journeymen days and the ability to get a job or two to start off with are all that thousands of builders have at first in the way of business assets. But once started, their equipment

The Living Room as It Appears Looking Toward the Open Fireplace End

The Cottage of a Chicago Builder—W. K. Johnston, Architect grows. The men with brains, those who are energetic, wise, patient, skilful and provident, unconsciously add to their equipment every day. They add business sagacity, business stability and increased reputation, and no factors in the contracting game are greater than these.

Your other contractor—he who is improvident, unskilful, dilatory, heedless and slack—he is adding to his equipment also, but the goods are of the wrong kind—heavy to carry, and, once assumed, very difficult to get rid of.

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Health Laws Upheld

Laws for the protection of the public health would fail in their purpose but for the deep interest taken in their enforcement by the plumbing trade throughout the country. A recent instance of the advantage of having an organization such as the State Examiners of Plumbers of Massachusetts is brought up in the case of a New Bedford plumber who was charged with doing the plumbing work without being registered or licensed as required by law. He was found guilty by the Superior Court, but filed exceptions to the rulings of that court. The case was then carried to the Supreme Court. The plumber claimed that he had a right to work at his will to earn his living by work at any lawful trade he thought fit and that the statute under which he had been found guilty unduly interfered with that right and was therefore unconstitutional. While the court upholds that the constitutionality of the law is sacred, and as claimed by the defendant, it ruled that it was not absolute, and the ruling was to the effect that, like almost every other individual right, it must yield to the right of government to impose such reasonable restraints as are required for the protection of public health and public morals, or in other words, the police power. The gist of the ruling which is brought to the attention of this journal by an officer of the Massachusetts Board of Examining Plumbers is that the full bench of the Supreme Court ruled that the right of the government to impose reasonable restraint as required for the protection of the public health was greater than the rights given to individuals under the constitution of the United States. This ruling doubtless will have interest outside of the plumbing trade. It will give great encouragement to workers in the sanitary field to continue their efforts to prevent that independent action which is beneficial only to the single interest of the man making a profit and which at the same time may be a menace not only to his customers but to the public in general.

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According to the New York State College of Forestry lumber has increased in price 30 per cent. every decade for the last 50 years, and forest products generally are bringing such high prices that more and more attention is being paid to the closer utilization of forest products.

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Voice of builder (from below): "Hey there, Mike! Shift that 'Romenesquire' capital to the front by the Egyptian doorway, and use the Gothic one on the Renaissance column. It'll make it look a deal more classy."

Important Changes in Building Practices

A joint meeting of the American Institute of Architects and the National Association of Builders Exchanges was held in Philadelphia during the third week in September. Both organizations were represented by committees, which were composed of officers and men from Boston, New York, Baltimore, Washington, Philadelphia and Louisville, who are prominent in their respective organizations.

The object of the meeting, which lasted three days, was to consider and recommend changes in the present practices of building construction, and to formulate and standardize building specifications, contracts, etc., on more equitable lines.

It is understood that all who were present approached the subject with broad views of equity, and with distinct and clear business principles. As a result a unanimous recommendation was readily reached. This joint recommendation will be properly referred to each national organization for approval, and it is reasonable to suppose that this approval will be readily forthcoming, and the present methods which are now being used in building operations, and which are so expensive and uncertain to owners and all interested parties, will be shortly relieved and these operations will be conducted along the lines of modern business principles and methods.

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Waterproofing Concrete

Many articles are appearing in the technical journals, written in the interest of special paints and coatings for concrete surfaces, in which it is stated that cement waterproofing, in powder or liquid form, decreases the strength of the cement or affects the metal used for reinforcement. These statements, as applied to the standard brands of waterproofing, are far from the facts in the case. Millions of pounds of waterproofing powder are used yearly by the leading engineers and cement-workers of the country, and the makers of standard waterproofing material have great numbers of tests, by reliable authorities, which show not the slightest injurious effect on strength.

As to the claim that a material like good waterproofing, which is absolutely neutral, insoluble, inert and unchanged with age, could attack the metal reinforcement is too absurd to be discussed. There is no doubt that the many attacks on cement waterproofing by parties interested in promoting other materials have done much to deter inexperienced users from adopting waterproofing material of recognized value, but trained engineers pay little attention to loose statements unsupported by proof, and base their judgment on reliable records of long-time tests.

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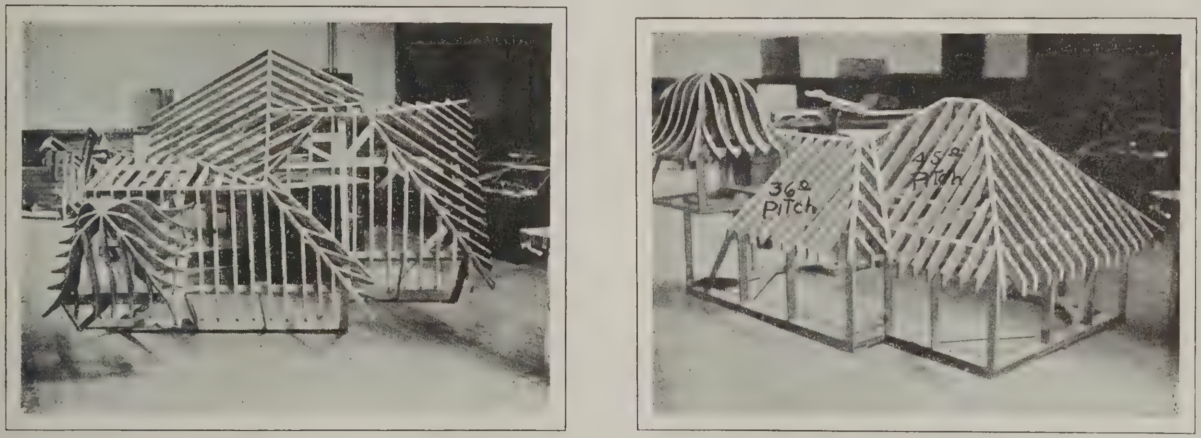
A feature of the Country Life Permanent Exposition in the Grand Central Terminal, New York City, will be a full size model bungalow containing seven rooms and equipped with up-to-date electrical appliances. It will be one and a half stories high and will be constructed of North Carolina pine. Chester A. Patterson has drawn the plans, and the contract will be executed by Frank N. Goble.

Laying Out Roofs of Unequal Pitch

A Detailed Description of a Graphic Method of Roof Framing — Models of the Work

By George H. Wilson

A SHORT time ago a correspondent made the request that I explain more fully in regard to the method for unequal pitches of roofs which appeared in the issue of the paper for September last year. In reply to this request I offer the following description and diagrams and would suggest that the use of the slide rule will be of great assistance and save much time to anyone intending to study roof framing. The various methods here shown and described are thoroughly practical and accurate. The writer has used them on many roofing jobs and they are practiced in the roof framing work by the students in carpentry at the Denver School of Trades of which I am instructor. The photographs show a small portion of what we do in roof framing. The model shown is one of a number that were built and indicates the unequal pitches.



Laying Out Roofs of Unequal Pitch—Various Models of Roof Framing, Showing some of the Excellent Work Done in the Denver School of Trades Under the Instruction of the Author

Referring to the accompanying diagrams, Fig. 1 represents the plan of a building to be roofed. The pitch of the main roof is 38½ degrees; that of the left hand dormer 35 degrees, and that of the right hand dormer 48½ degrees. The different pitches are also shown by the rise in each case. One end of the building is 4 ft. 3 in. out of square, so this gives us a good problem for practice.

Beginning with the main roof it may be stated that 12 ft. 9 in. is half the width of the building and with a rise of 10 ft. gives the hypothenuse 16 ft. 2⅜ in.—the length of the common rafters *A-D* and *C-D*.

The left hand dormer wall plate is 3 ft. above the wall plate of the main roof, which brings the foot of the valleys *E* and *F* 3 ft. 10 in. in from the wall line. The ridge is 5 ft. 6 in. above the wall plate *G* to *H* or 8 ft. 6 in. above the wall plate of the main building *I* to *J*, as shown in the elevation. Now draw a line from *J* to the ridge *K* shown on the plan. This will be the intersection of the valleys, but it will be necessary to run one valley through the main ridge to *L* for support. This now gives the position or plan of the valleys *E-L* and *F-K*.

To obtain the length of the valleys erect a perpendicular at right angles from valley *E-L* 7 ft., as this is the rise above the wall plate to *M*. Draw a line from *E* to *M*, which gives the length of the long valley. Erect a perpendicular from the intersection of the valleys to the line *E-M* at *N*. Then *E-N* will be the length of the short valley. The top and foot bevels are also here shown.

To obtain the lengths and bevels of jack or cripple rafters commence with the main roof where they are spaced 16 in. on centers. Make the distance *R* to *S* 11 ft. 4 in., which is the longest jack rafter, and draw a line from *S* to *L* giving the stretchout of the long valley. Now carry out the lines of the jacks to *S-L*, which will give the correct length of each and the edge bevel. As, however, there might be a slight discrepancy by scaling each one separately the following is an accurate method of obtaining the difference in the length of each, providing, of course, that all the spaces are equal. As, however, the space between 1 and 2 is less than 16 in., rafter No. 2 measures 3 ft. 8.5 in., subtract this from No. 7 which is 11 ft. 4 in. and divide the remainder by 5—the number of spaces—gives 1 ft. 6.3 in.—the difference in each rafter.

Here is another method of obtaining the edge bevel of all jack rafters of any pitch by the use of the steel square. It will be noticed on the diagrams that the edge bevel of the jack rafters is the hypothenuse of a right angle, consequent upon the length of the common rafter on one side and the ridge or wall plate on the other. Take for example the length of the longest jack or common rafter 11 ft. 4 in. on the blade and the distance *R* to *L*, which measures 9 ft. 10 in. on the tongue, and the blade will give the bevel.

We will now develop the left hand dormer. First lay out a profile of the common rafter by the rise given. Stretch out the common rafter, crossing the seat of the valley on the wall plate at *F* from *T* to *V*. Now draw a line from *K* to *V* which gives the stretchout of the short valley. Extend the lines of the jack rafters to *K-V*, which will give the correct length of each, or proceed as before, subtracting the short rafter from the longest and dividing the remainder by the number of spaces which will give the difference in the length of each.

Here it will be noticed that the spacing of the jack rafters on the dormers are not the same as on the main roof as the valleys are not placed on an angle of 45 degrees as is the case on a regular pitched roof. On an unequal pitched roof and dormers, however, the jack rafters should intersect with each other on the valleys or hips, making the spacing on the main roof regular.

The right hand dormer will be laid out in the same manner and in addition is shown another and simple method of obtaining lengths of jacks by extending their lines or positions through to the profile of the common rafters as shown on *A-D*, *H-h* and *a-b*. This gives the correct length of each, also the difference in the length of each. It is a complete graphic description of their relative and correct lengths. It may here be stated that no allowance has been made for thickness of ridge, valleys or hips; all lengths are from center of ridge to center of hip or valley.

Now the edge bevel of hips and valleys: Lay out half the thickness on each side of the plan of hip or valley as shown at *X* in the upper part of the diagram, Fig. 1. Erect perpendiculars at right angles to this and then lay out the same thickness on the outside of the stretchout of the hip or valley as at *Y*. Next square over from *W* and *U*. Draw the diagonal which gives the edge bevel.

The backing of hips and valleys is illustrated in Fig. 2 of the diagrams which requires very little description. It can be applied to any pitch roof, equal or unequal, and is probably the simplest of all methods as it can be laid out on the actual hip or valley without drafting. Another important point is that it is easy to remember.

First procure a piece of stuff the same thickness as the hip or valley and make the foot cut on one end. Now set it on the wall plate in the exact position the hip or valley is to be placed and draw lines on the under edge. Run gauge lines on each side intersecting with the lines on the foot cut and bevels may then be set to it. Fig. 2 illustrates the backing for the valleys on the right hand dormer.

Another method for obtaining the backing of hips and valleys is also shown. Measure from the corner 1 an equal distance each way—any distance will do—and draw the diagonal 14-15. Take note that this is at right angles to the plan of the hip. It is shown again on valley *c-d*, but on account of this valley not being on an angle of 45 degrees the points *k* and *l* are not equal distance from *d*. Now draw a line at right angles from hip 1-5 to the point 16. Describe an arc with radius on 16-17, cutting plan of hip at 18. Draw lines 14 to 18 and 15 to 18 and the angles at 18 give the backing. This can be applied to roofs of any pitch.

For the lengths and bevels for the skew end of the building, commerce with the center rafter on the end. This will be the same as the common rafter 16 ft. 2⅜ in. Make this the stretchout from 6 to 7 and draw lines from 3 to 7 and 1 to 7. This again gives the length of the hips stretched out. Extend the lines of the jack rafters to the hip 3-7 which gives the lengths and edge bevels of the jacks for half of the end. Repeat the process for the other half.

The points 6, 8 and 9 indicate the position and lengths of the rafters for half of the end. The lengths of the hips are also shown, 3 to 4 and 1 to 5.

Architects of America War Relief Fund

A committee of which the chairman is R. Clipston Sturgis, president of the American Institute of Architects, has issued a call to the architectural profession of the country for funds to be used for the relief of the sufferers from the present European war. The call reads in part as follows:

The debt which architecture owes to the countries of Europe is neither measurable in words nor payable in money, but in view of the appalling conditions brought about by the present war—the terrible suffering—the threatened destruction of that which can never be replaced—it is eminently fitting that the architects of America should unite and in the name of their profession and their art do their part towards affording some measure of relief to those upon whom this catastrophe has fallen. Money is needed and it is profoundly hoped that every architect will contribute in the largest possible measure. It is further sincerely hoped that every architect will give something—for it is the wish of the committee that this fund may not only be large but that it may be truly representative of the profession, which, more than all others, owes its inspiration to the forebears of these people who are today bearing the intolerable burden of the most frightful war the world has ever seen.

The treasurer of the fund is C. H. Whitaker, The Octagon, Washington, D. C., and subscribers may designate the country in which they wish their contribution expended. "He gives twice who gives quickly."

The Care of Oilstones

There are three objects to be attained in using and caring for an oilstone: First—to retain the original life and sharpness of its grit; second—to keep its surface flat and even; third—to prevent its glazing.

To retain the original freshness of a stone, it should be kept clean and moist, says C. F. Gillette. To let an oilstone remain dry for a long time or expose it to the air tends to harden it. A new stone should be soaked in oil for several days before using. All India and Crystolon stones are oil-filled by a patented process before leaving the factory, which insures a moist, oily sharpening surface with the use of only a small quantity of oil, and eliminates a very disagreeable operation.

To keep the surface of an oilstone flat and even merely requires care in using. Tools should be sharpened on the edge of the stone, as well as in the middle, to prevent wearing a trough-shaped depression. It is impossible to prevent a stone becoming slightly hollowed with long usage, but this can be remedied by grinding the stone on the side of a grindstone or by rubbing it down with an abrasive brick.

To prevent an oilstone glazing, the user must first understand what causes a stone to glaze. This can best be explained by showing why oil and water are used on sharpening stones, and how they should be used.

The word "oilstone" has come to be applied to all stones used for sharpening mechanics' tools, from the fact that it is necessary to use oil on most of them for two purposes; first, to prevent the stone from heating the tool, which draws its temper and ruins the best tool instantly; second, to keep the particles of steel ground off the tool from entering the pores of the stone, which would soon fill them up, producing a glazed surface.

Most coarse-grained and all soft stones can be used successfully with water, although they must be generally termed "oilstones." On such stones, water should be used plentifully to carry off the powder rubbed up by the tool. Most water-stones are quick cutting and leave a coarse edge, but a much finer edge can be procured upon the same stone by using just enough water or oil to rub up a paste. This paste when kept on the stone will give a finishing edge, but should be thoroughly cleaned off before putting the stone away.

Fine-grained, hard stones should always be used with oil, as water is not thick enough to keep the steel out of the pores. The dirty oil should always be wiped off the stone, thoroughly, as soon as possible after using it. This is very important, for if left on the stone the oil dries in carrying the steel dust with it and causing the stone to glaze.

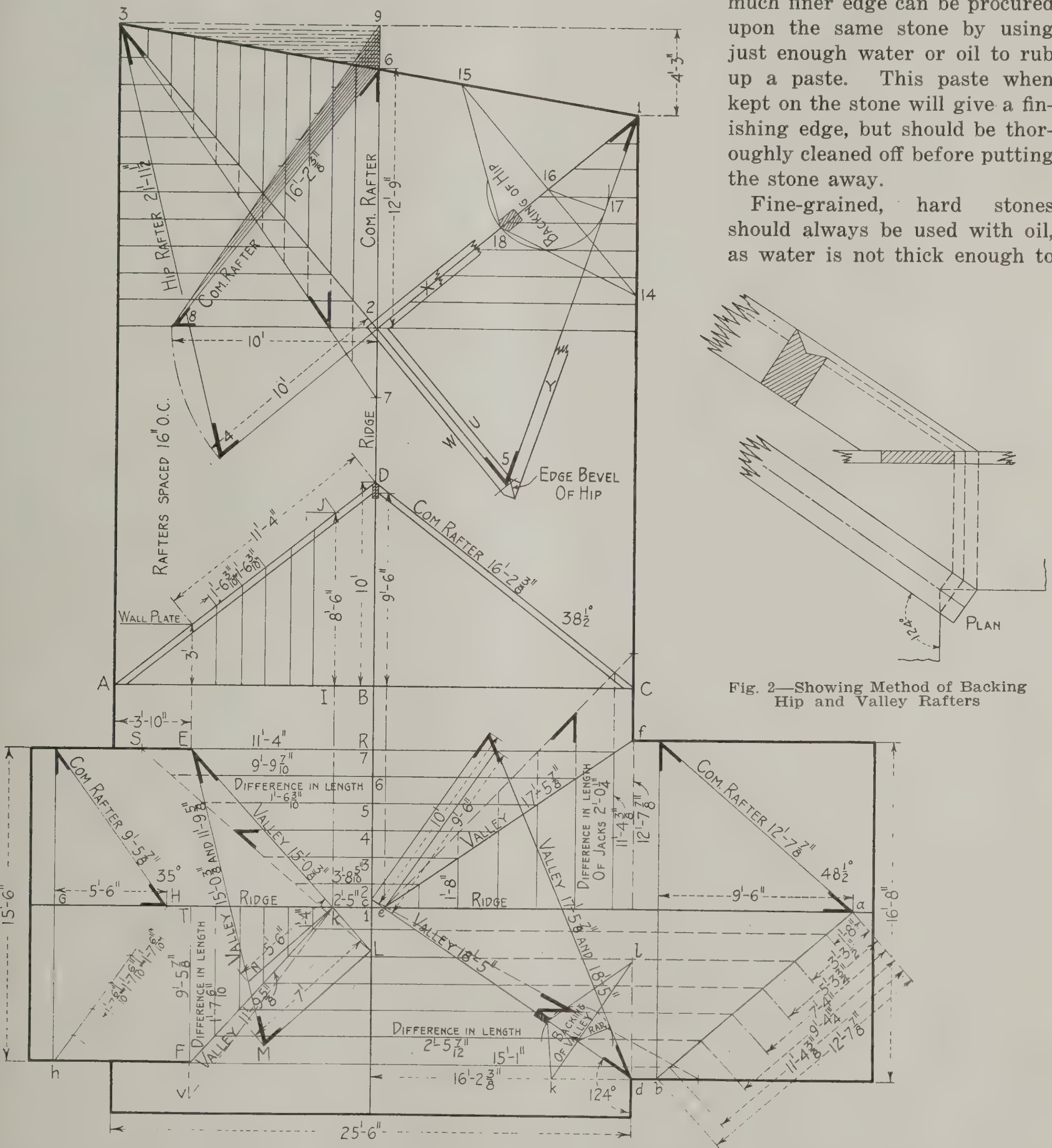


Fig. 1—Plan of a Building to be Roofed and Showing Method of Finding Lengths and Bevels of Hips, Valleys and Jacks

Laying Out Roofs of Unequal Pitch—By George H. Wilson

Fig. 2—Showing Method of Backing Hip and Valley Rafters

Cotton waste and kerosene oil, gasoline or ammonia are best for cleaning a stone and are always to be found in a shop. Never use turpentine to clean a stone, for it is gummy and fills the pores of the stone. Some carpenters use shavings, but these are apt to leave the stone full of dust. An ordinary clean rag would be better.

How to Select Oilstones

The question now arises, how shall we select a stone for our use? First, we should consider the purpose for which a stone is to be used. Do we want a fast-cutting stone in preference to a slow-cutting stone. There are three kinds of cutting edges—coarse, medium and fine; also, oilstones are made in three grades—coarse, medium and fine.

The coarse stones are used for sharpening large and very dull tools, nickel tools, machine knives and for general use where fast cutting is more desirable than fine finish.

The medium stones are for mechanics' tools in general, more particularly those used by carpenters and in woodworking establishments. This grit gives a medium fine stone.

Fine stones are used by machinists and engravers, die workers, instrument makers and all who require a very fine, keen edged tool.

The Coarse-Edged Tools

Practically all the coarse-edged tools are knives. By "coarse" edge we do not mean it is not a sharp edge. The ideal edge for a carving knife is a "coarse" edge—best because such an edge will do its work perfectly and because to take extra time to get a finer edge on a slower cutting stone would be just a waste of time. Knives do not require a fine edge because they are always used with a diagonal or saw-like motion. This adds to the cutting efficiency and at the same time the slight coarseness of edge, in its turn, adds to the saw-like effect, again making the cutting easier. These tools include canvas cutting knives, carpet knives, carving knives, bread knives, paring, kitchen, household and farm knives of all kinds. Some of these tools require a finer edge than others, but all can be given the best edge for their work on a coarse stone.

Requirements of Medium Edge Tools

Medium edge tools require more smoothness than a coarse edge affords but yet do not need extreme fineness. These are the tools used by most mechanics—more particularly the broad, bevel-edged tools such as chisels, planes, draw knives and others used by carpenters and wood workers.

One would naturally suppose that to secure a medium edge he should use a stone of medium grit. This is not entirely correct. The average mechanic buys the medium grit stone in order to secure both fast cutting and a fine enough edge from one stone. Except for special uses, the more satisfactory way is to use a coarse stone for rapidly cutting the edge down until it is ready to finish and then to finish on a fine stone to whatever degree of fineness is desired. For this reason a combination stone, which unites a coarse stone and a fine stone, is more useful than a medium stone. Combination stones are becoming more and more popular among users of oilstones.

Proportioning Aggregates for Portland Cement Concrete

One of the very interesting papers read before the American Society for Testing Materials at their convention, was that on the above subject by Albert Moyer. This paper has been printed in pamphlet form from the proceedings of the Society and in the introductory pages Mr. Moyer gives the following summary:

"The object of the investigations into the proper proportioning of aggregates for Portland cement concrete is to obtain maximum density which, other things being equal, the author considers gives maximum strength.

"One of the principal results obtained in these investigations was that arbitrary specifications without previous knowledge of the character of the aggregates that are to be used are wrong, and that such stated proportions as 1:2:4 or 1:3:6, etc., are meaningless.

"It was found that 94 lb. per cubic foot, or 3.8 cu. ft. per barrel, as a unit of measurement is incorrect. Investigations prove that it takes 110 lb. of Portland cement to make 1 cu. ft. of paste. The author finds that, opposed to the old plan of filling the voids in sand with cement, these voids must necessarily be filled with paste (cement and water), and that the study of the proportioning of aggregates must be based on the proper proportions of cement, water and sand to make a sufficiently rich mortar to bind together the larger aggregates. The cement must be measured by weight, using 110 lb. as equivalent to 1 cu. ft. of paste. If a 94-lb. bag is used as a unit for measurement, the proportions must be figured so that the same proportion of cement to sand is obtained as when based on 110 lb. of cement per cubic foot of paste.

"For the purpose of economy, various sizes of stone should be used and investigation made to see which sizes will produce the least percentage of voids, so that less mortar may be used and more strength obtained, for the reason that mortar is not as strong under compression as mortar and crushed stone or pebbles mixed together in the form of what we term concrete.

"The paper gives various methods of carrying on investigations, so that with a given sand and a given stone or gravel, proportions can be stated by the engineer which will make a concrete of maximum density and maximum strength."

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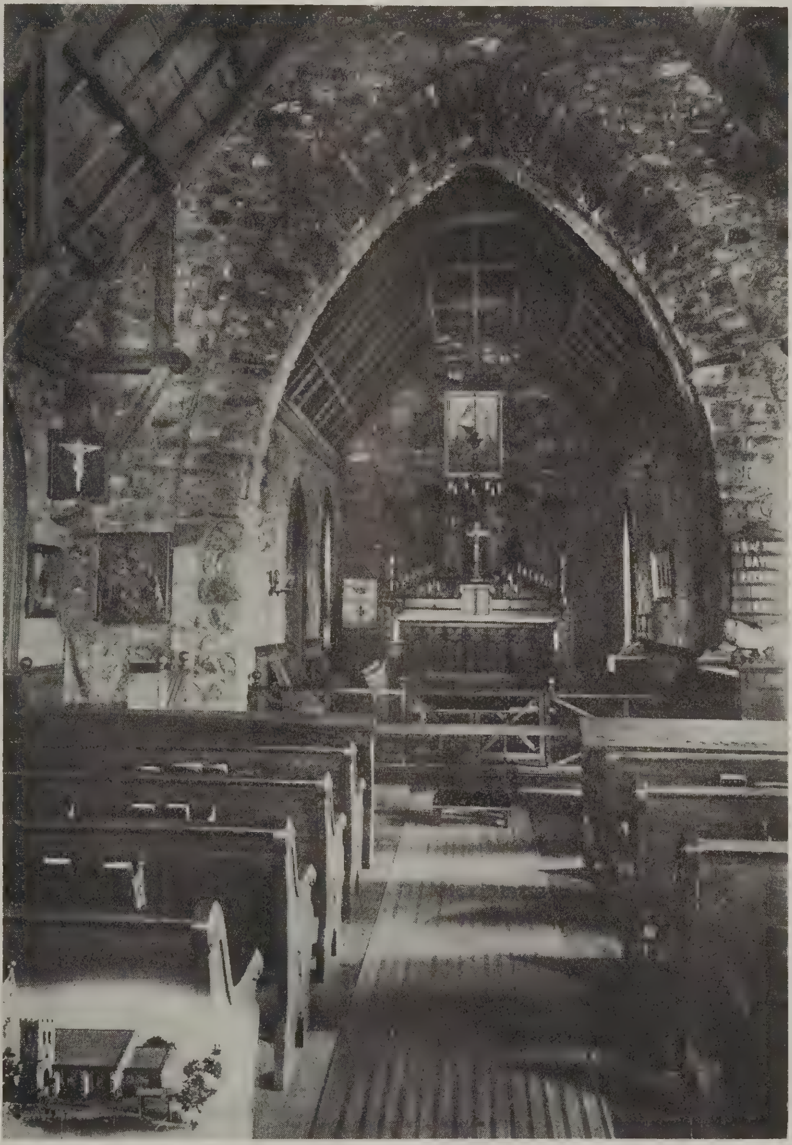
Limiting Frame Houses

The suggestion of placing a limit in the suburban districts of New York outside of the fire limits within which frame construction will be restricted to detached dwellings appears to be meeting with considerable favor. Reports from the boroughs affected show that many of the real estate operators as well as the residents approve of the project and the feeling is quite general that all sections of the city in which development of any kind has started might very properly be included. In view of this general sentiment the outlines for the suburban limits have been drawn to include large areas where heretofore there was no restriction.

Chapel of Rustic Masonry Construction

Intended for Use in Summer Months Only, It Has No Heating System and Is Lighted by Oil Lamps

THE interesting example of rustic stone work illustrated and described upon the pages which follow relates to a chapel recently erected at Cragsmoor, Ulster County, N. Y. An inspection of the pictures shows the chapel to be built of rough stones just as they were picked up from the field. Many of the stones used are fragments of the rock so common in the Shawangunk Mountains and sometimes known as "pudding stone." It is a conglomerate rock composed of white, flinty pebbles which nature in some mysterious manner has firmly cemented together. These fragments of rock which ages ago were ground smooth on some now lost sea floor have again become solidified and are very effective when used in the rough. Some idea of the effects produced may be gathered from an inspection of the exterior views of the chapel found on another page, together with a detail of one of the sides of the clock tower.



Interior View in Chapel of Rustic Masonry Construction Looking Up the Aisle Toward the Altar

The roof timbers are covered with ⅞-in. beaded ceiling laid horizontally, and over these are 18-in. cedar shingles laid upon shingle lath. No trusses are used in the roof over the chancel, the timbering here being carried out to match the main roof, but is somewhat lighter. The rafters are 6 x 8 in. and the braces at the eaves are constructed of 6 x 6 and 6 x 8-in. members all carefully framed.

All stone walls are carried on concrete footings 4 ft. below grade. The walls above grade are laid in a lime and cement mortar. Owing to the density of the mortar used and the care taken to properly bed the stones the interior of the building is surprisingly dry. All copings and the outside steps are of 3-in. flagstones.

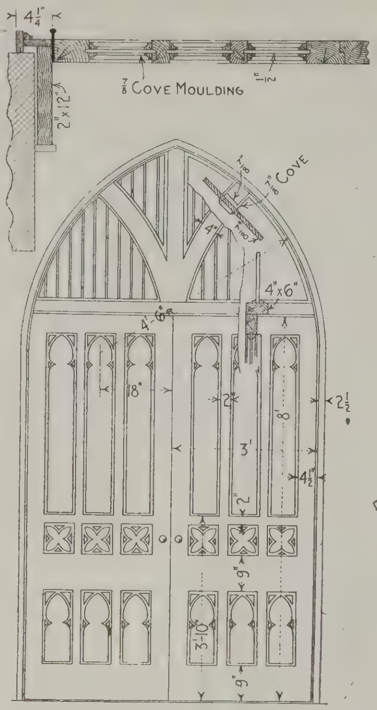
Although not shown on the plans, leader pipes are carried from the roof gutters down the corners formed by the buttresses and the main wall.

In the tower is a large electric clock run by dry batteries arranged on shelves in the clock loft. These batteries were at first located in the excavated portion below the tower, but it was found to be too damp there for them; hence the arrangement described. Connected with the tower clock is a clock in the back of the auditorium.

There is a large bell in the bell loft over the clock loft, the lofts being reached by ladders through trap doors. The bell being very heavy, it was hoisted up before the floors were laid. After the floors were put down the bell and its frame were lowered into place.

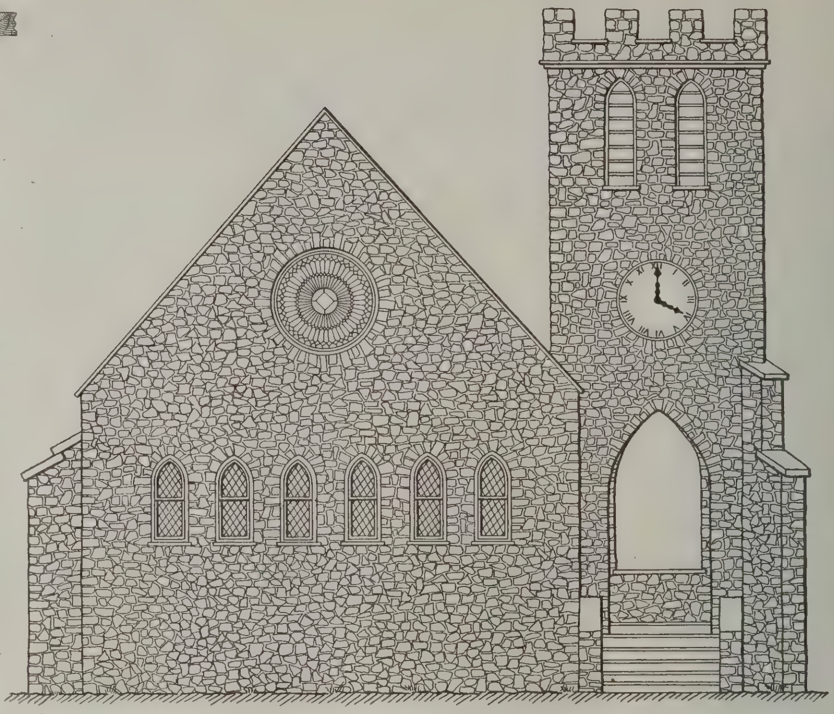
The outside trim of the chapel is white pine, painted dark green in color.

The picture presented upon the first page of this

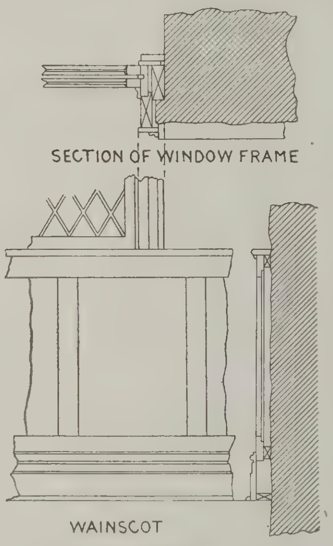


Details of Front Door—Scale ½ In. to the Foot

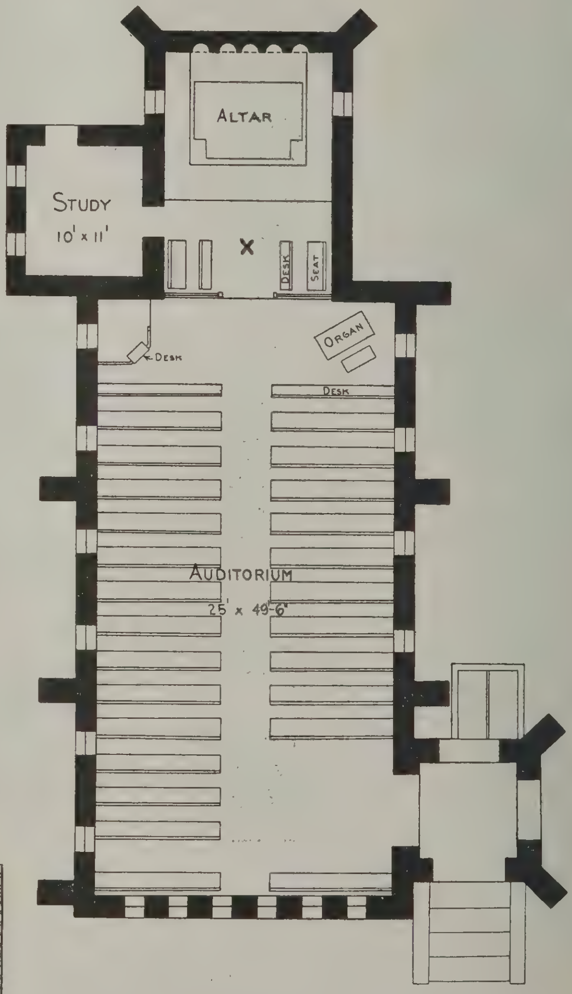
Elevation of Front Door—Scale ¼ In. to the Foot



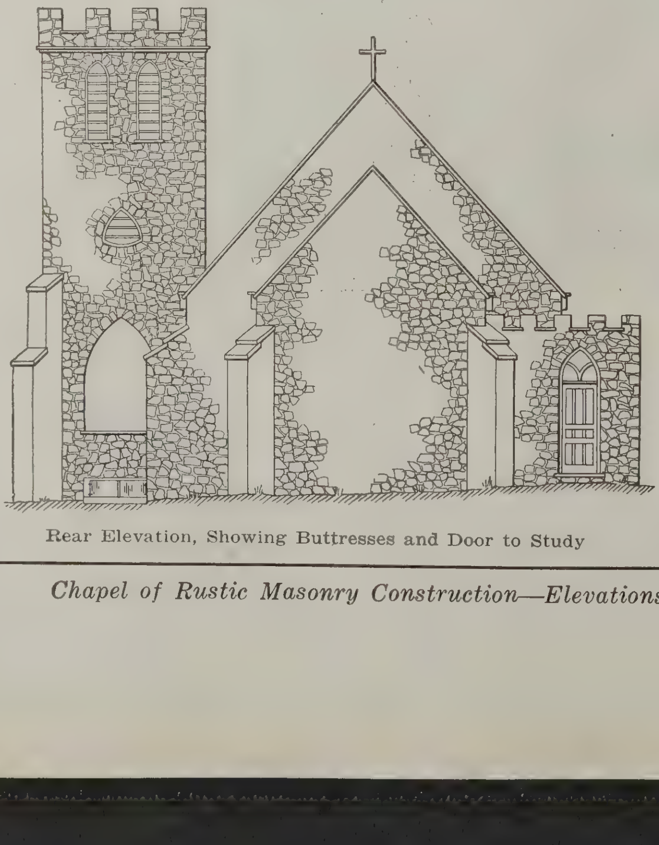
Front Elevation of the Chapel—Scale 3/32 In. to the Foot



Details of Wainscoting and Window-Frame—Scale ½ In. to the Foot



Floor Plan—Scale 1/16 In. to the Foot



Rear Elevation, Showing Buttresses and Door to Study

Chapel of Rustic Masonry Construction—Elevations, Plan and Various Constructive Details article is an interior view looking toward the altar, and affords a good idea of the general appearance and finish, as well as a part of the roof framing. It will be noted that the interior as well as the exterior is finished in natural field stone. The interior stone work is finished somewhat smoother than the outside face of the wall, the pointing being flatter, and in doing the work the stone hammer was occasionally brought into use.

Showing Rustic Effects of the Masonry Below the Clock in the Bell Tower

The floor beams are 2 x 10 in., spaced 16 in. on centers, and are cross bridged. The floor is double, the under floor being of rough hemlock boards laid diagonally, while the finish floor is of 7/8-in. comb-grain yellow pine, laid at right angles to the floor beams. Heavy building paper was placed between the two floors.

As the chapel is in use during the summer vacation season only there are no arrangements for heating and the lighting at night is by means of oil lamps, there being one at each side window, and there is a chandelier at the front, as shown by "x" on the floor plan.

All interior woodwork is yellow pine, filled and varnished, while the furniture and fittings are of oak. A number of memorial windows have been presented to the chapel from time to time, and these are fitted inside of the regular sash of the building.

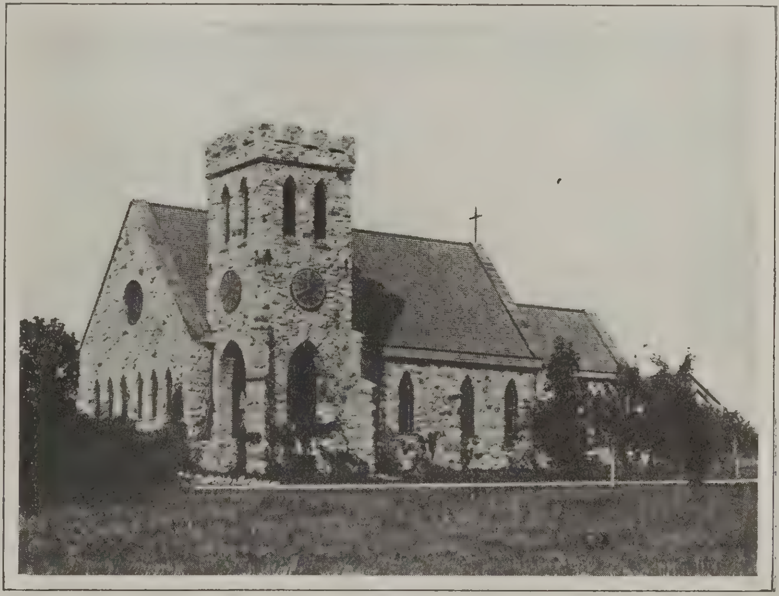
The organ in use is a large house organ, and is taken out of the church during the winter months.

The chapel was built by day's work, and all bills were paid by Mrs. E. G. Hartshorn, of Newport, R. I., who has her summer home at Cragsmoor, N. Y. The drawings of the church were prepared by Architect Frederick S. Dellenbaugh, of Cragsmoor, N. Y.

The masonry work of the chapel was commenced under the supervision of John M. Keir, of Cragsmoor, who died before the building was completed, and the stone work from the window sills up was done by the head mason, Antonne Ross. The foreman carpenter was Lon De Witte, of the same place.

The Approach to the Chapel

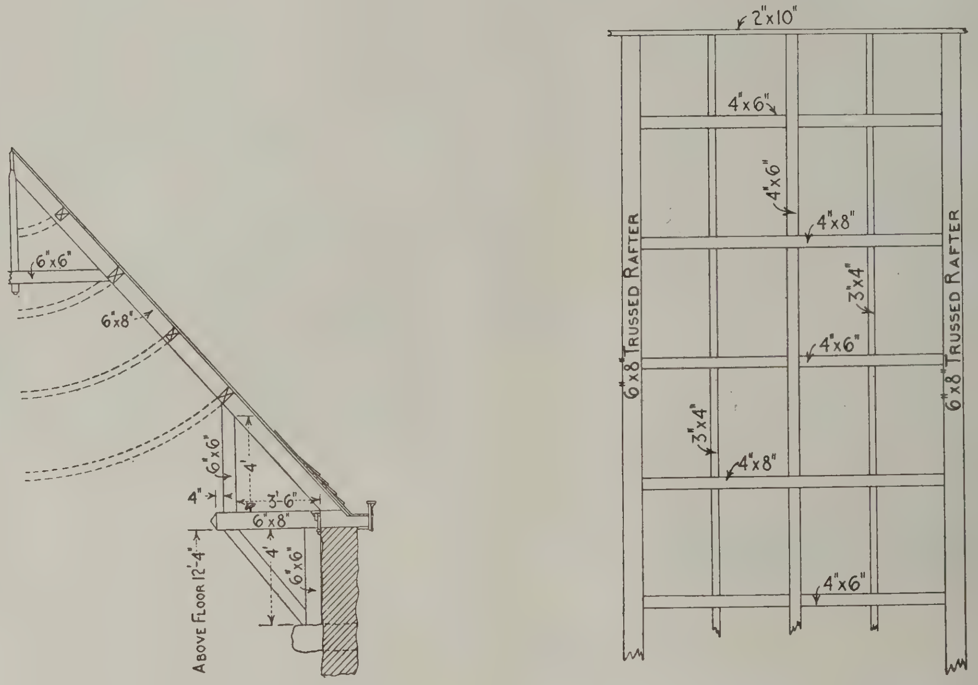
The chapel was built about 18 years ago, and was one of the first jobs in the nearby country on which Portland cement was used, and the fact that the cement was delivered in bags caused considerable comment. Portland cement is used so generally at the present time that it seems strange it should still have been a new material in some places such a short time ago. The work as executed is an excellent example of rustic masonry construction.


A Photographic Perspective of the Building Showing the Front and Side

A Chapel of Rustic Masonry Construction

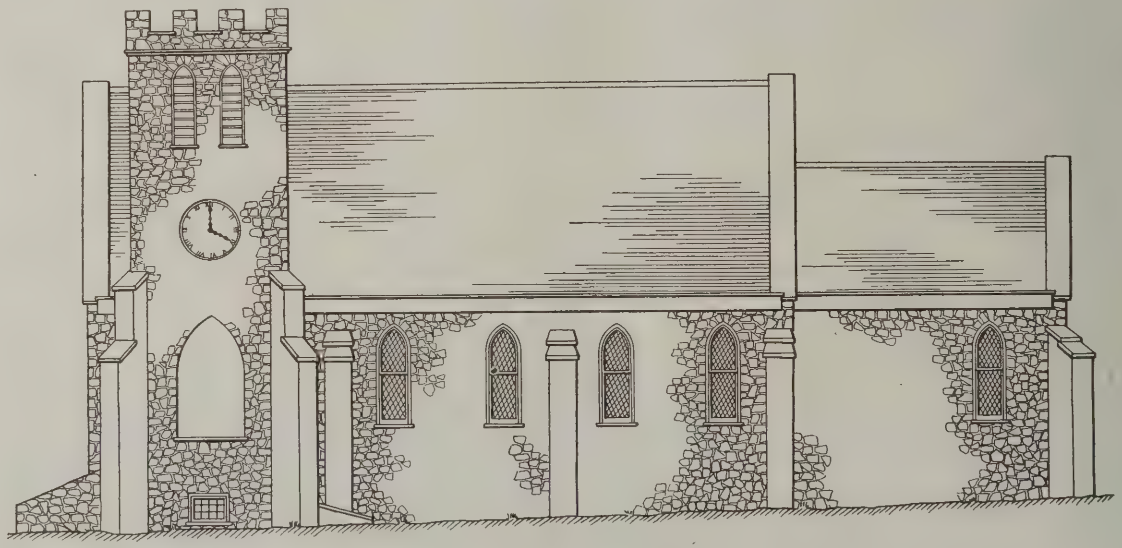
Education in Building Construction

Those who wish to enter the profession or trades and have a desire to acquire in the school that information and training which will equip them to take advantage of opportunities offering in their respective callings are likely to be interested in the curriculum of the St. Paul Institute, St. Paul, Minn., which started the new school year on September 28. There are 13 courses each consisting of two terms of 12 weeks each. The courses of special interest to readers of *The Building Age* include elementary architectural drawing; intermediate architectural drawing; detailing of sheet metal work with shop practice; elementary electric construction; intermediate and advanced electric construction; architectural sculpture and modeling; building construction; structural steel design and construction, and reinforced concrete design and construction.



Details of Trussed Rafter—Scale ⅛ In. to the Foot

Panel of Roof Framing—Scale 3/16 In. to the Foot



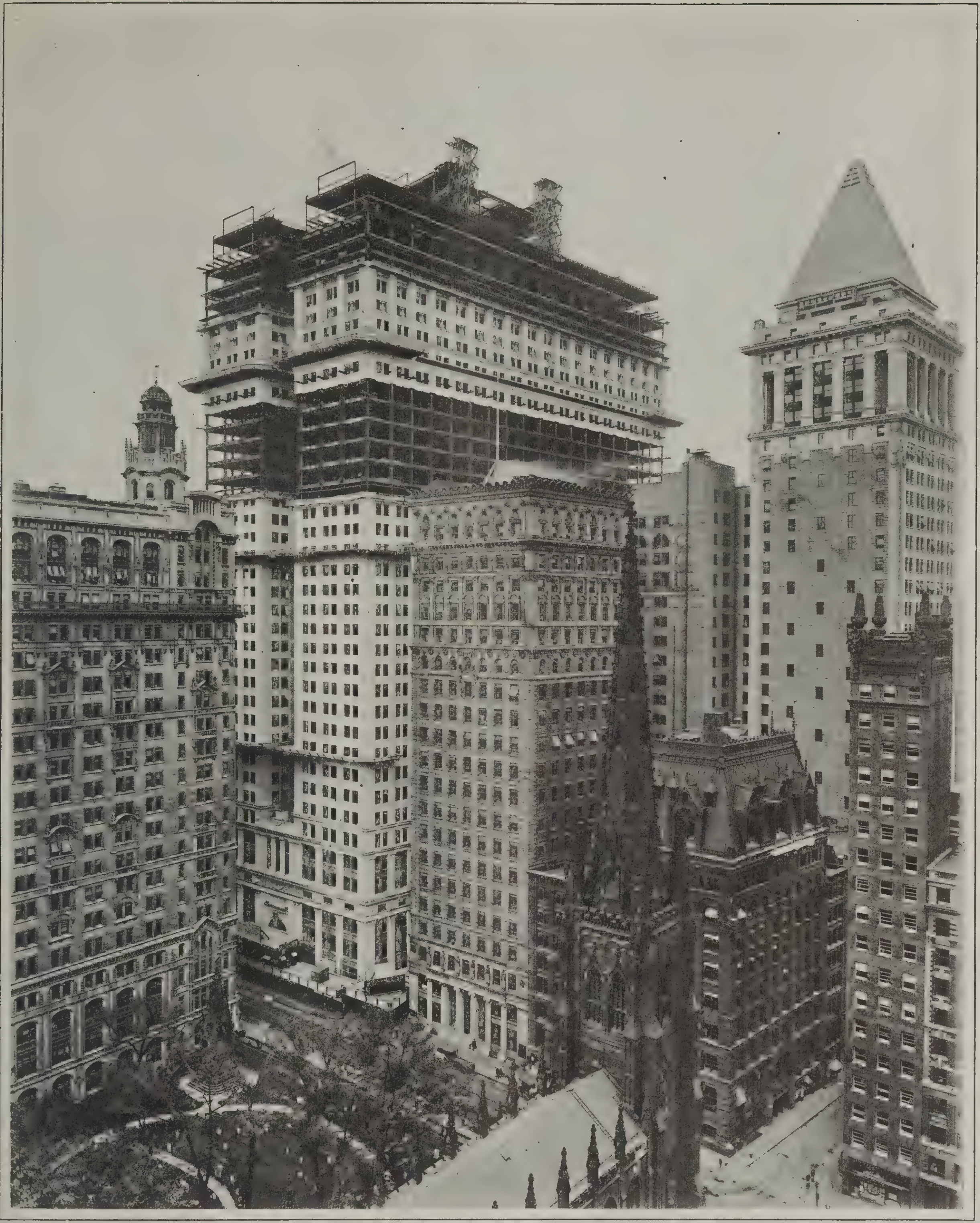
The South Elevation of the Chapel Showing the Buttresses More in Detail

A Chapel of Rustic Masonry Construction

The instructor in building construction is Lewis H. Harnsberger, who has had many years experience as a contractor and builder. He has also had special training as a teacher in the mechanical lines at the Stout and Bradley Institutes.

The details of the course in building construction include use and abuse of tools; the care and sharpening of saws; the use of the steel square; laying out and squaring foundations; framing of all kinds; interior finish; stairs; roof trusses, and detail and reading of blue prints.

The particular purpose of this class is to take young men from the trades and give them practical instruction which will make them more efficient workmen and capable of taking charge of work.



Copyright, 1914, Irving Underhill, N. Y.

The new 38-story building of the Equitable Life Assurance Company, occupying the entire block bounded by Broadway, Pine, Cedar and Nassau Streets, New York, as it appeared September 4, 1914, after the steel-frame had been completed and the encasing masonry nearly finished. It has a floor space of 45 acres, is 537½ ft. above the curb level and 50 ft. below it, will house nearly 15,000 persons, and will cost about $28,000,000. The picture clearly indicates a novel feature of skyscraper construction—that of carrying up the masonry work from different levels at the same time. At the extreme right the tower-like structure is the new Bankers Trust Building; at the extreme left is the Trinity Building, and in the foreground is the steeple of Trinity Church.

A Modified Colonial Country House

A Unique Floor Plan Arrangement in Which the Central Hall Extends Entirely Through the Building

WE have taken for the basis of our colored supplemental plate this month a country house of modified colonial architecture and embodying features of arrangement which are somewhat out of the beaten track. The treatment of the exterior is well managed and the harmony of effect is brought about by a judicious use of brick for the first story in combination with clapboards for the second story and the end gables. An enclosed porch at one end makes an excellent sunparlor or conservatory according to preference.

The Central Hall

The feature of the main floor is the 8 ft. hall extending through the house from front to rear. The stairs rise from a point well back from the front and are of the combination type, so arranged that one section lands in the hall on the second floor convenient to the principal rooms there located, while the other section of the stairs lands in a small hall out of which opens the servant's bedroom and bathroom. Directly under the servant's stairs is the flight leading to the cellar.

At the end of the main hall as one enters the house is a living room 22 x 14 ft. 6 in. in size and out of which opens the enclosed porch. Toward the rear of the house is a toilet room.

At the right of the main hall are library fitted with open fireplace in one of the corners and dining room with bay window and seat. Communication between the dining room and the kitchen is through a butler's pantry fitted with sink under the window and facing which is a dresser. The kitchen forms an extension at the rear and is fitted with the modern improvements. On the second floor directly over the living room is a large sleeping room and out of it opens a sleeping porch which is also accessible from the hall. The main bathroom is directly at the front of the house and over the entrance hall. On this floor are two other sleeping rooms together with servant's bedroom and bath room.

The Foundation Walls

The foundation walls are of concrete 12 in. thick with a spread footing course. The exterior of the walls was given a coat of waterproofing before the back-fill was rammed in place. The first story has 12 in. brick walls, while the second story walls are of frame covered with sheathing boards and over them are clapboards with building paper between.

The rafters are covered with 1 x 10 in. sheathing boards over which is a layer of building paper, and this in turn carries Maine cedar shingles laid with an exposure of 5½ in. to the weather.

The girders are 6 x 8 in. yellow pine resting on brick piers and the floor beams of the same material are set 16 in. on centers and bridged every 10 ft. with herringbone bridging. The other framing is of hemlock. The outside finish and trim is of North Carolina pine.

The chimneys are of brick covered on the exterior of the building wherever exposed with two coats of stucco with "pebble-dash" finish and colored a cream white. The flues have 8 x 12 in. fire clay flue tile.

The floors are double, the finish floors being tongued and grooved and blind nailed. All interior trim is of chestnut. The entrance door is veneered with white oak on a pine core.

The Bath Room and Plumbing

The rooms are plastered with three-coat work and hard white finish in halls and all rooms except kitchen and pantry. The bathrooms have tile floors with tile base and cove. The walls for a distance of 5 ft. above the floor have a wainscoting of Keene's cement finishing with a molded cap. The plumbing fixtures are of the open type and the flush and supply pipes where exposed as well as faucets, etc., are nickel plated.

The house is piped for gas and wired for electric lighting, the fixtures being of the combination type. The house is heated by hot air furnace with fresh air box connected directly to the open air.

All exterior woodwork has three coats of linseed oil paint and the roof shingles are stained a dark green. All inside trim is filled and varnished.

The architect gives the approximate cubic contents of the house as follows:

	Cu. ft.
Main house, 38 x 23½ ft. by 22 ft. average hight....	19,646
Extension, 14 x 18 ft. by 17 ft. average hight........	4,284
Porch 9 x 22 ft., by 10 ft., average hight............	1,980
Cellar, 38 x 23½ ft. by 6½ ft., average depth.........	5,804
Total	31,714

Figuring this at a unit price of 19 cents per cubic foot gives an approximate cost of $6,025.66.

Estimate of Cost of Labor and Materials

The estimated cost of labor and materials entering into the construction of this house are given by the architect as follows:

Estimating	$130.00
Grading	55.00
Masonry, including cement, concrete, etc...........	1,481.00
Plastering	320.00
Mill work and carpentry........................	2,108.00
Painting	280.00
Heating	390.00
Plumbing	425.50
Mantels	80.50
Metal work, tiling, etc........................	315.00
Gas and electric work..........................	362.00
Hardware	78.50
Total	$6,025.50

The plans and specifications of this country house were prepared by Architect Frank T. Fellner, 413 Caton Avenue, Brooklyn, N. Y., or care *The Building Age*, 239 West 39th Street, New York City.

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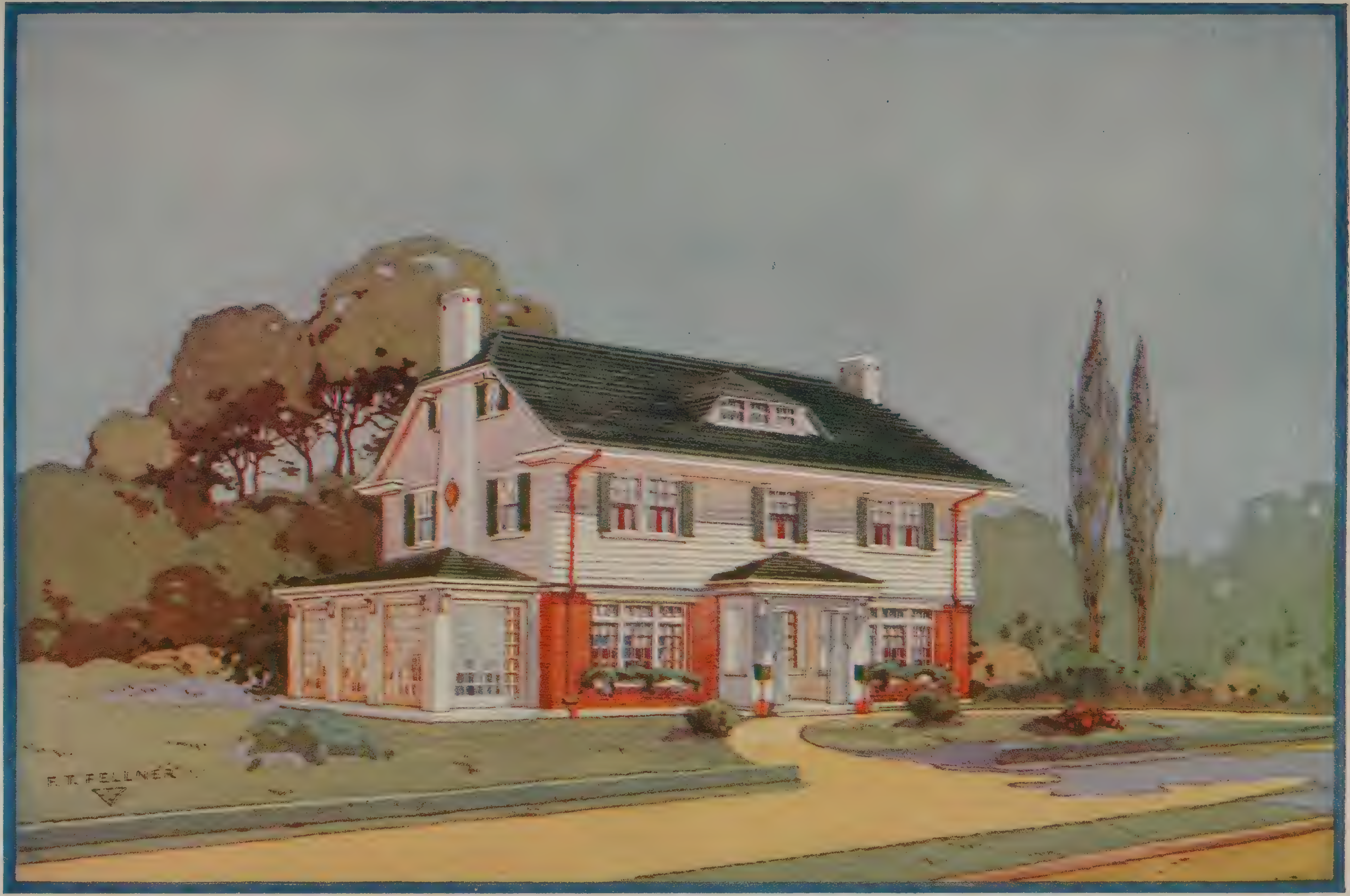
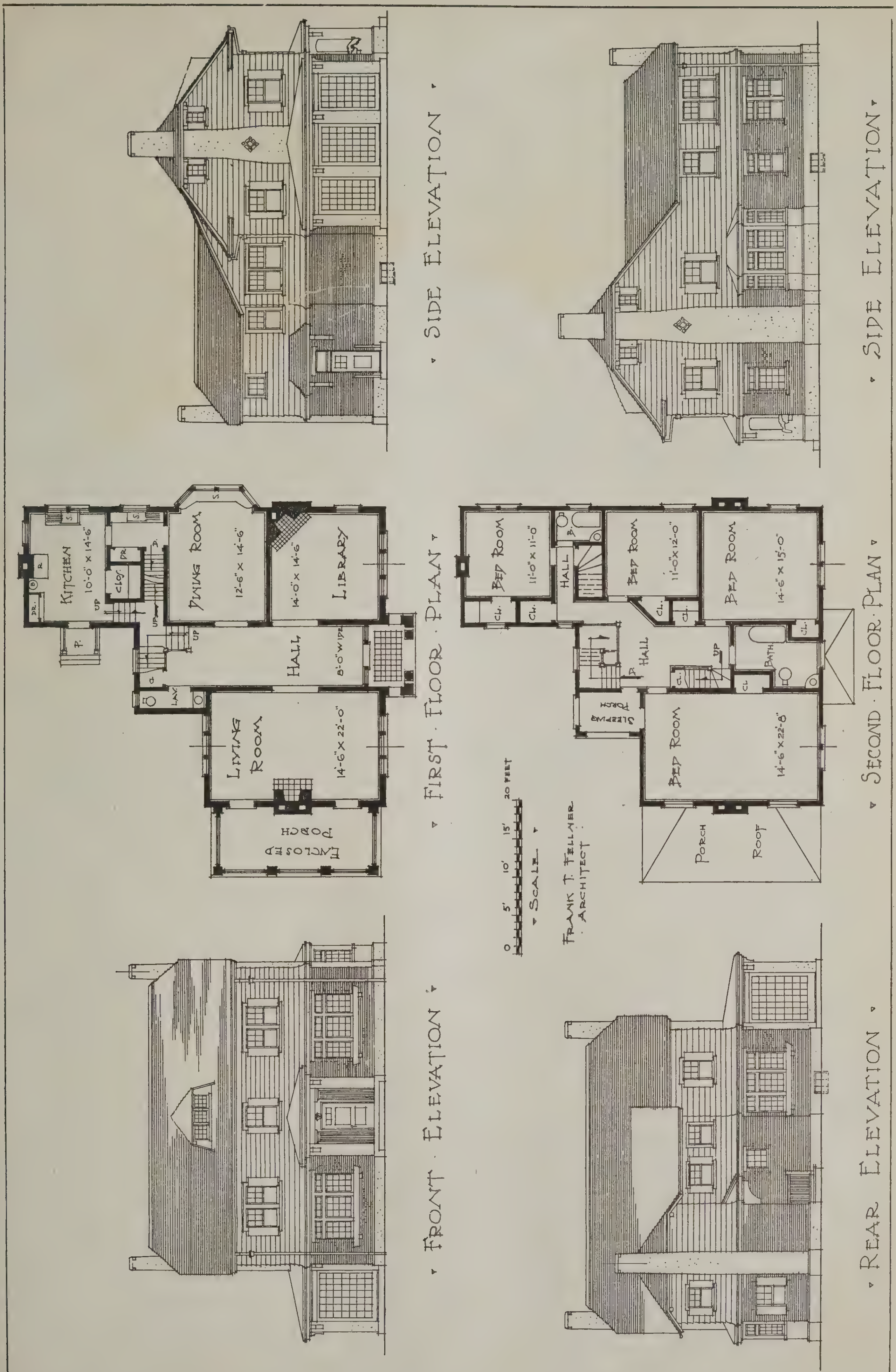
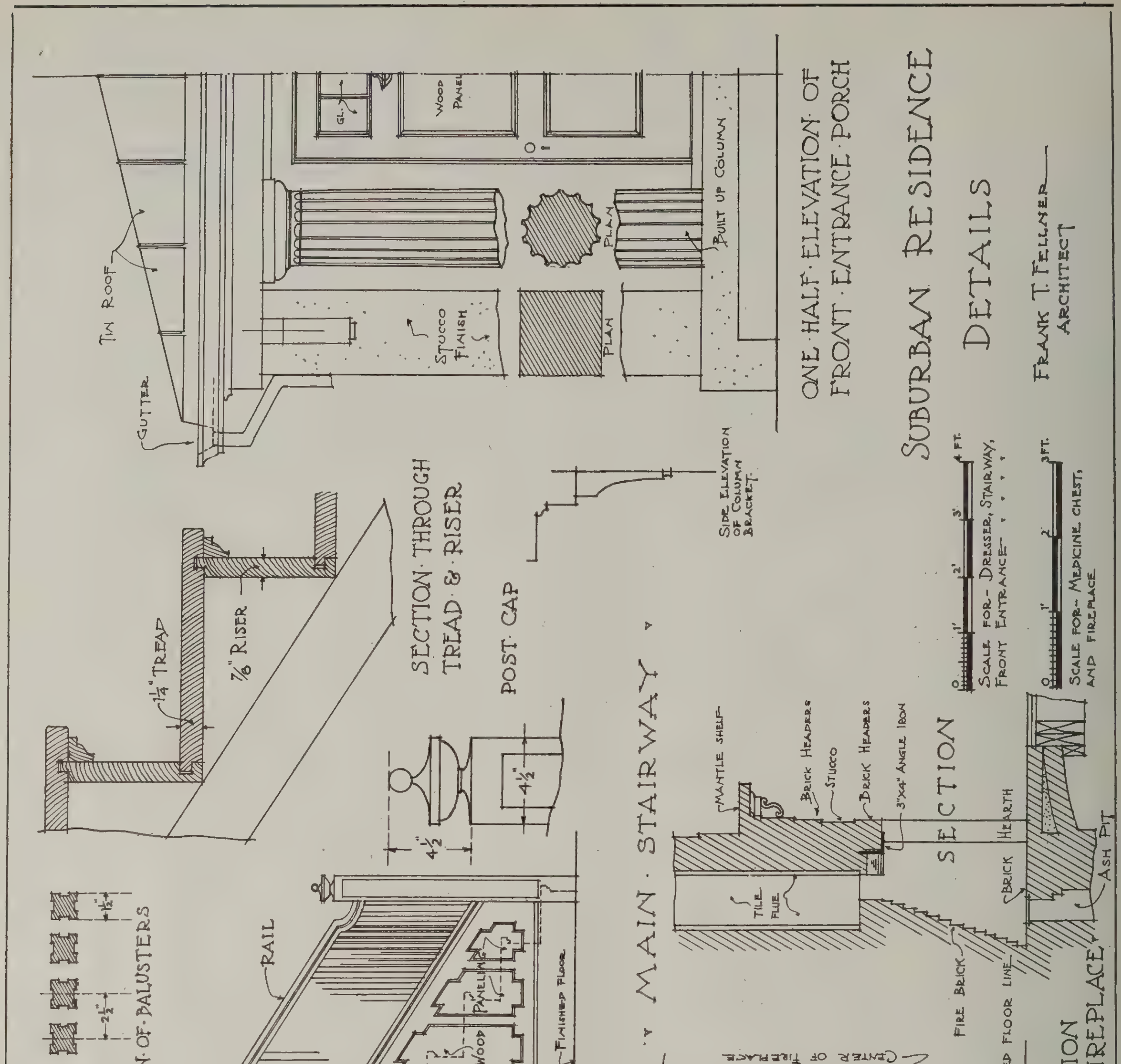
Cornell University, Ithaca, N. Y., recently dedicated a Forestry building in connection with the State College of Agriculture.


F. T. FELLNER



Plans and Elevations Relating to Residence Forming Basis of Our Colored Supplemental Plate



Constructive Details Relating to Residence Forming Basis of Our Colored Supplemental Plate

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

To divide a line into any number of equal parts use the geometrical principle of similar triangles. In Fig. 20 let *A-C* represent any line that is to be divided into any number of equal parts. The length is such that no regular scale can be used readily for the purpose. Set off from one end any line as *A-B* at any angle. This line is drawn to some scale and divided into as many equal parts as it is desired to divide the line *A-C*. Connect *B* to *C* and through the divisions on the line *A-B* draw lines parallel to *B-C*, as shown.

A number of curves are used by engineers and scientists, the most useful of which, and the only one used by structural designers, is the parabola. This curve is formed by cutting a section through a cone parallel to the slope, as shown by the line *E-F* in Fig. 21. The major axis in all curves is designated by the letter *A* and the minor axis, at right angles with the major axis, by the small letter *a*. The axes of a parabola are infinite, so for this curve *A* designates height and *a* one-half the base.

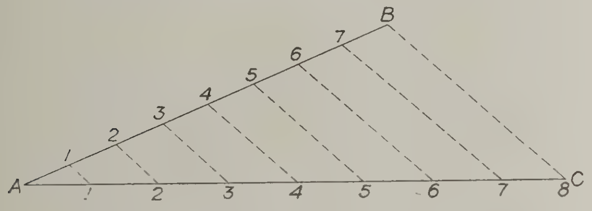


Fig. 20—Division of Line Into Equal Parts

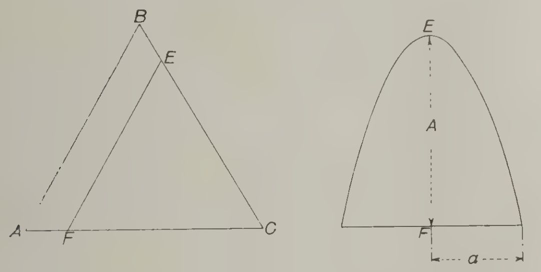


Fig. 21—Section of Cone Developed Into Parabola

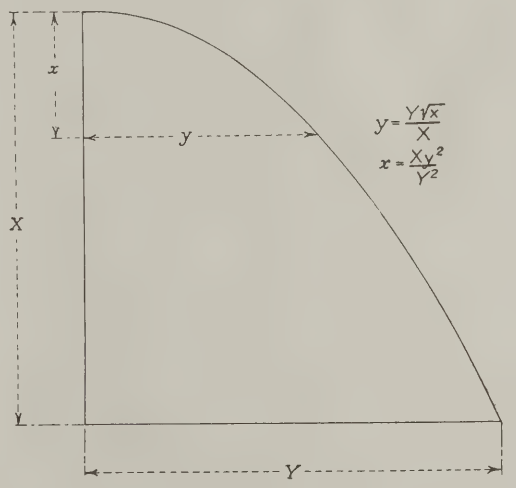


Fig. 22—The Parabola and Its Equations

Design of Beams, Girders and Trusses

In Fig. 22 let X and x = the abscissas and Y and y the ordinates of the parabola. The abscissas are parallel to and the ordinates are perpendicular to the major axis. Assuming X and Y each with a value of 1, and X divided into 10 equal parts, the following values are obtained, numbering the spaces from the bottom up.

Points on X	Ordinates (Y)
1	0.949
2	0.894
3	0.837
4	0.775
5	0.707
6	0.633
7	0.548
8	0.447
9	0.317

Assuming X and Y each with a value of 1, with X divided into 8 equal parts, the following values are obtained:

Points on X	Ordinates (Y)
1	0.936
2	0.866
3	0.791
4	0.707
5	0.612
6	0.50
7	0.353

To construct a parabola by using a table of ordinates erect a perpendicular at the middle of the span having a height equal to the bending moment, using any convenient scale. Divide the line into 8 or 10 equal parts and through the division points draw horizontal lines parallel with the beam. Multiply the half span by the value of the ordinate for any line and set off to scale the length of the ordinate. Connect the ends by means of a French curve and thus obtain the parabola. In this method the scale for all horizontal lines is the scale used in drawing the beam.

In Fig. 23 another method is shown. Divide the span of the beam into any number of equal parts, numbering from each end as shown. Multiply the moment by the product of the two figures under any line and divide by the product of the two equal figures under the moment line. The result is the length of the perpendicular at the two numbers. Connecting the upper ends of the perpendiculars by

---

Note—In this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 39 of the October issue.

using a French curve, the parabola is drawn. The scale used in drawing the perpendicular lines is the scale used in setting off the value of the bending moment at the middle of the span.

Example—Compute the moments at the points shown in Fig. 23

$$\frac{1000 \times 6 \times 4}{5 \times 5} = 960$$

$$\frac{1000 \times 7 \times 3}{5 \times 5} = 840$$

$$\frac{1000 \times 8 \times 2}{5 \times 5} = 640$$

$$\frac{1000 \times 9 \times 1}{5 \times 5} = 360$$

The parabola in Fig. 23 was constructed by using perpendiculars computed as shown and the curve drawn with a French curve. The middle perpendicular line was divided into 10 equal parts and the ordinates to the major axis measured off on the horizontal lines to check the accuracy of the curve. This is recommended as an exercise for the student.

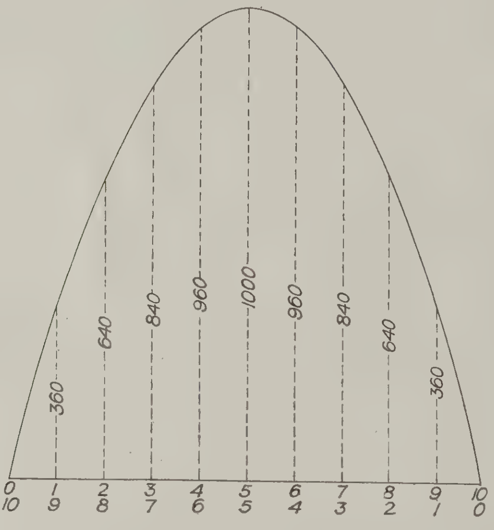


Fig. 23—Ordinate Method for Constructing Parabola

Design of Beams, Girders and Trusses

A graphical method for constructing a parabola is shown in Fig. 24. The perpendicular representing the bending moment at the middle of the beam is set up and a rectangle drawn, with a height equal to the bending moment and a width equal to the span. The horizontal lines of the rectangle are divided into any number of equal parts and the vertical end lines into half this number. In the example the horizontal lines are divided into 8 parts and the vertical lines into 4 parts. From the apex radiating lines are drawn to the end divisions and vertical lines are drawn through the horizontal divisions. A curve is drawn through the intersections of the radiating and vertical lines.

All the common methods in use for drawing parabolas have been given in order that the students may have a choice of methods as well as to show that in even the most ordinary matters there are several ways of accomplishing a result. The man who knows only one way for doing anything is apt to be dogmatic and think his way alone is right. An ingenious man will discover for himself many ways to shorten his work when he knows he is not compelled to adhere to some method he has been shown.

When the height of the parabola is greater than the span more accurate results may be obtained than when the height and span are nearly equal, or when the height is less than the span. Use a scale that will give results with the accuracy required for the work. In some work the height of the parabola may be much less than the span and still give results sufficiently accurate. When the height of the parabola is not greater than one-tenth the span a semicircle may be used. For cantilever beams the vertex of the parabola is at the support. For beams on two or more supports the vertex of the parabola between the supports is at the top.

For one concentrated load in the middle of a beam resting freely on two supports drop a perpendicular line under the load to represent the amount of the bending moment, as shown in Fig. 25. Connect the lower end, *C*, of the line by straight lines to *A* and *B*. Measuring vertically from any point on the center line of the beam to the bounding line, *A-C-B*, gives the bending moment at that point. The moment at any point may be computed also if the arithmetical method is preferred to the graphical method. The load being concentrated at the middle of the span

$$M = \frac{PL}{4}$$

To compute the bending moment at any section,

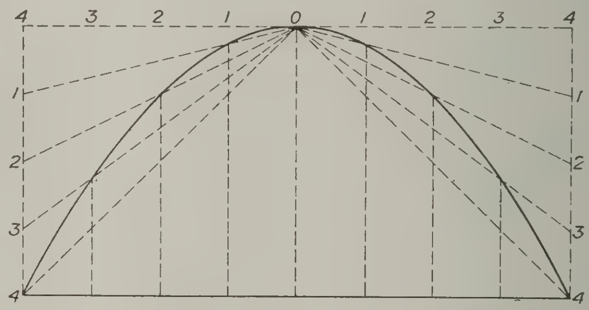


Fig. 24—Graphical Method for Constructing Parabola

x-x distant y from the end, use the principle of similar triangles

$$\frac{L}{2} : \frac{PL}{4} : : y : x$$

from which (for the load only)

$$M = \frac{\frac{PL}{4}}{\frac{L}{2}} = \frac{PLy}{4} \times \frac{2}{L} = \frac{Py}{2}$$

The shear diagram is shown below. For a concentrated load the shear is constant from the load to each end and the end shear is always equal to the reaction.

In Fig. 26 two concentrated loads are shown. Call the length from either end a and that from the other end b. Then under each load (for the load only)

$$M = \frac{Pab}{L}$$

Through each load drop a perpendicular and set off the bending moment on each line for the load above that line. Connect the ends of the lines to the ends of the center line of the beam, thus making two triangles. Under each load is the moment due to the load, plus the moment due to the other load shown by the intercepts, P-b and P_1-b_1. From a set off a-$c = P$-b and from a_1 set off a_1-$c_1 = P_1$-b_1. The total moment under $P = P$-c and under $P_1 = P_1$-c_1. Connect the points by the lines a-c-c_1-B, thus forming a bending moment diagram (for the loads only). The bending moment at any point on the beam is obtained by measuring from center line of beam to the bounding line.

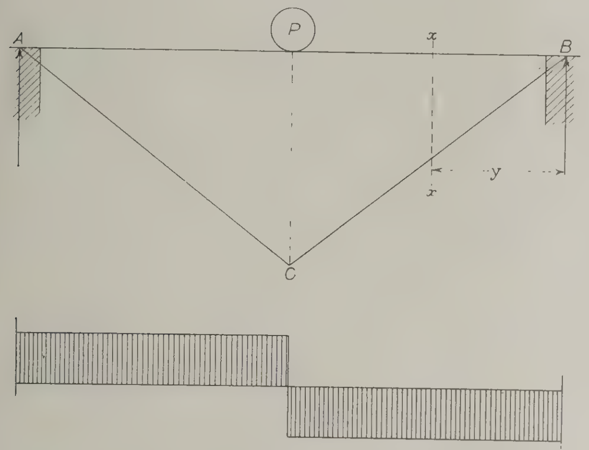


Fig. 25—Graphical Solution for One Concentrated Load Resting on a Beam

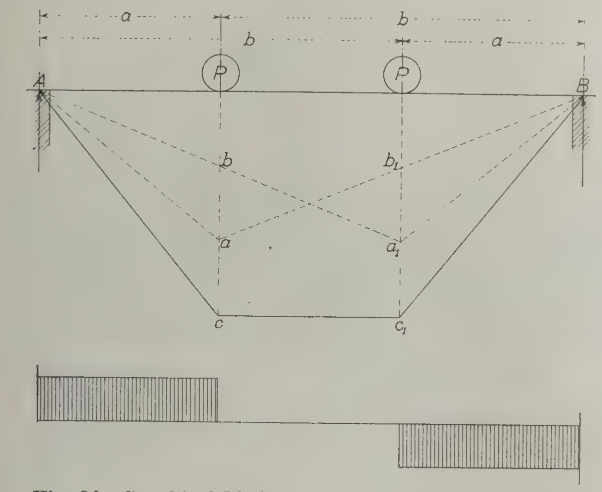


Fig. 26—Graphical Method for Two Concentrated Loads Resting on a Beam

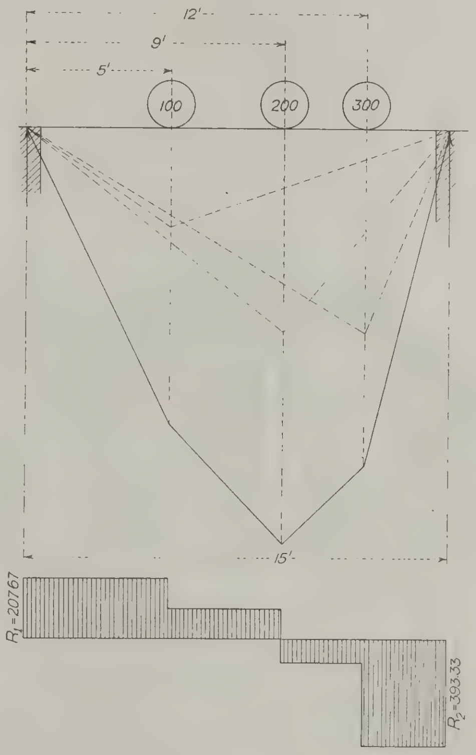


Fig. 27—Graphical Method for Several Loads on a Beam

Design of Beams, Girders and Trusses

In Fig. 27 is illustrated the application of the method just described to three loads. Any number of loads may be similarly treated, no matter how unequal in weight nor how unevenly spaced.

(*To be continued*)

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A building operation is being commenced in West Philadelphia, Pa., which will involve the construction of 103 houses and 6 stores at a cost of nearly $250,000. The houses are to be two stories high, with bay windows and porches. The heating will be by hot water system. The contractor is James Arthur, 3206 North Second street, Philadelphia, Pa.

◆

Cleaning Pressed Bricks Stained by Smoke

For the cleaning of bricks in the walls of a church that had been blackened by coal smoke and which settled on the coping and washed down over the light colored hydraulic pressed brick, and where dilute muriatic acid, pearline and other substances had been tried without satisfactory results, the *Painters Magazine* suggests the following procedure: Muriatic acid will not remove smoke stains, nor will soda or soda ash do it. Smoke stains must be removed by scrubbing and rubbing with the proper solutions.

Try the following method: Mix one gallon soft soap, two pounds powdered pumice and one pint of liquid ammonia, beating the mixture well. After carefully dusting the brickwork, apply the mixture, that should be in the form of a soft paste, in a fairly thick layer with a fibre brush, allowing it to remain for about twenty minutes; then rub it in on the bricks with a good, stiff scrubbing brush, using plenty of elbow-grease. Use a large sponge and plenty of lukewarm water to remove the lather, and then rinse with clear water, or, if convenient, use a hose for rinsing. This if properly done, will remove the most stubborn case of discoloration by smoke from brick or stone.

◆

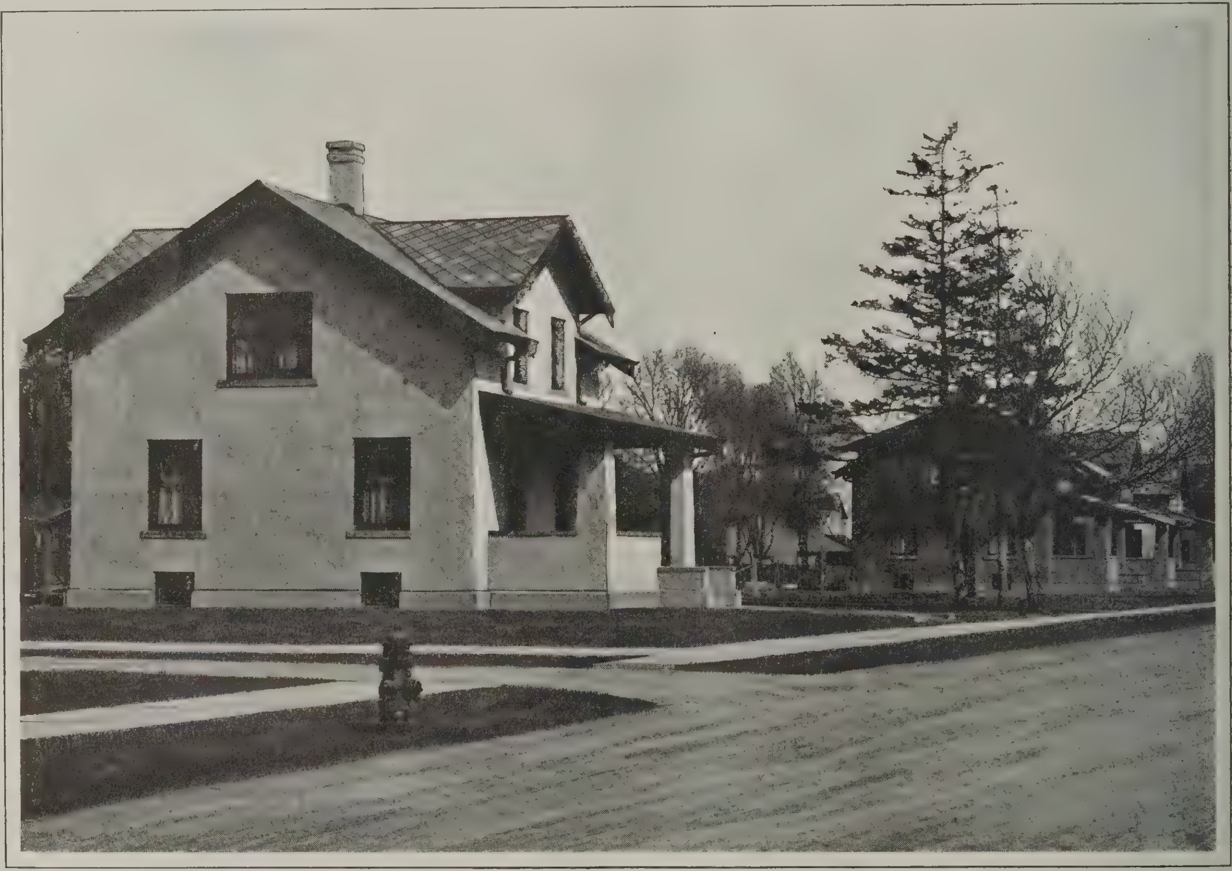
The New York State College of Forestry at Syracuse, N. Y., reports 244 men registered for the four and five year professional courses in forestry and representing 46 counties in the state and 11 states outside of New York. The foreign countries represented are China and Russia.

A Hollow Tile Cement-Coated Cottage

A Well Arranged Dwelling Which Strikingly Exemplifies What Can Be Done by an Expenditure of $2500

THAT the fire-resisting qualities of hollow tile construction with its accompaniment of greatly reduced cost of insurance are becoming more and more appreciated by the prospective home builder is strikingly manifest in the increasing numbers of dwelling houses of this nature which are being erected year by year. That the construction is equally applicable to the very moderate cost dwelling as well as to the expensive mansion is constantly being demonstrated. A most interesting example of what can be accomplished in the way of a hollow tile cement-coated dwelling by an expenditure of no more than $2500 is illustrated herewith. The picture represents a street scene in one of the residential sections of Sandusky, Ohio, and the cottage on the street corner in the foreground is the one which forms the basis of our article. It is the home of Bert Martin, who is associated with the Sandusky Portland Cement Company of the city named, and we are indebted to him for the photograph, floor plans and descriptive data.

An inspection of the picture shows the cottage to be a two-story affair covering a ground area of 23 x 28 ft., not including the front porch which has a depth of 8 ft. The porch extends across the greater portion of the front of the building and from it one directly enters the capacious living room which with the main flight of stairs occupies the full width of the house. Beyond the living room is the dining room and out of this opens the kitchen. The sink is placed directly under the rear windows so as to afford ample light, while the gas stove is in the angle opposite the rear entrance and yet sufficiently near the side window to secure ample light during cooking operations.



A Hollow Tile Cement-Coated Cottage—Henry C. Millott, Architect, Sandusky, Ohio

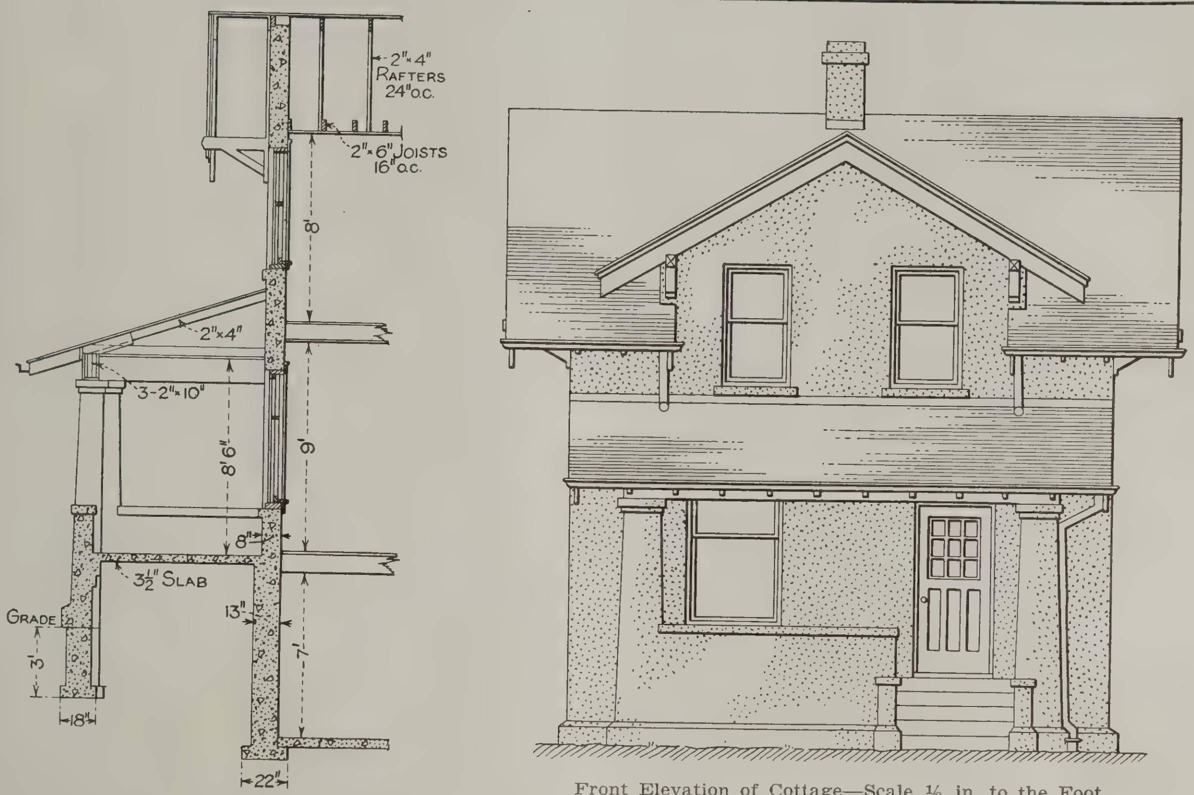
In addition to the rear entrance to the kitchen there is one at grade at the side of the house which gives access to the cellar and by ascending four steps one may also reach the kitchen level.

The main flight of stairs lands near the center of the second floor and from the short hall ready access is had with the three bedrooms and bath room. Each bedroom has opening from it a commodious closet and adjoining the head of the main flight of stairs is the linen closet.

The floor plans here presented show the general arrangement of the rooms, while the various details suggest the construction which has been employed.

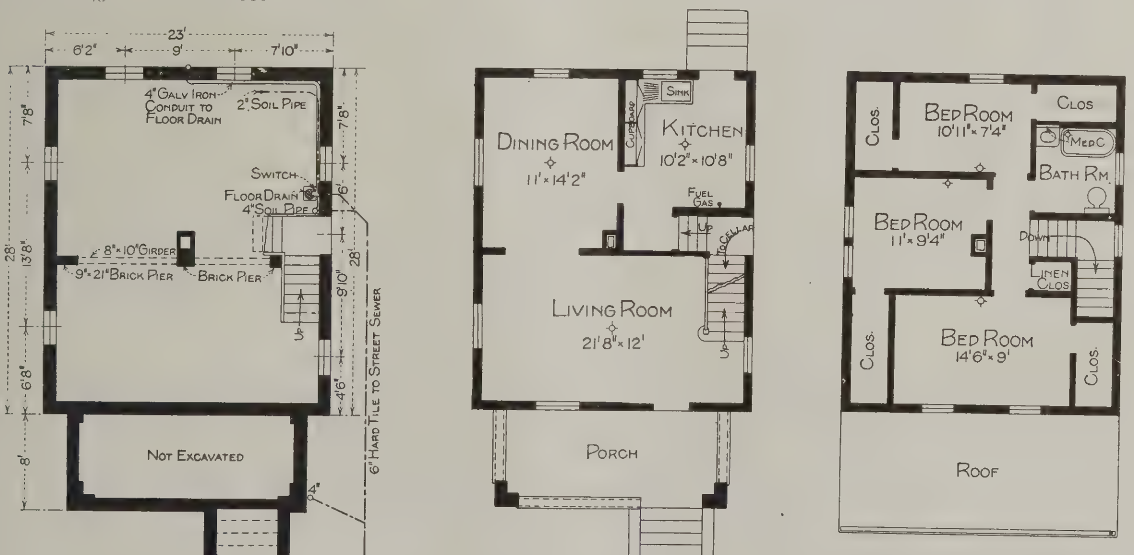
The foundation walls are of concrete, while the exterior walls above grade are of hard burned 5 x 8 x 12 in. hollow tile made by the Hinde Brick & Tile Company, of Sandusky, Ohio. The lintels are of the same material filled with concrete reinforced with two ⅜ in. rods. The stucco finish of the exterior is ¾ in. thick and consists of two coats, each being ⅜ in. thick.

The first coat of stucco consists of one part Medusa gray Portland cement, three parts sand and 10 per cent. hydrate of lime. The second coat of stucco consists of a mixture made up of one part Medusa white Portland cement, 2½ parts sand with about 5 per cent. hydrate of lime, each coat being applied as above stated ⅜ in. thick. The outside walls were given a float finish.



Vertical Section Through Porch—Scale ⅛ in. to the Foot

Front Elevation of Cottage—Scale ⅛ in. to the Foot



Foundation

First Floor

Second Floor

Scale 1/16 in. to the Foot

A Hollow Tile Cement-Coated Cottage—Plans, Elevation and Detail

The chimney and piers are of common brick. The porch floor is of concrete consisting of a 1:2:5 mixture, the top dressing being ¾ part cement and 2 parts sand, reinforced. The coping and cap are of the same material. The porch ceiling is of ⅝ in. yellow pine and is finished in the natural state.

The roof is covered with veneer red asbestos shingles furnished by Keasbey & Mattison Company, Ambler, Pa.

The cellar floor consists of 2 in. of cinders, 2½ in. of concrete and a top dressing 1 in. thick. Medusa waterproofing to the extent of 2 per cent. of the weight of cement was used for plastering the cellar walls, and the result is quite remarkable, as the cellar is perfectly dry even after very heavy rains. The walls are plastered 1 in. thick on the interior with a mixture of 1 part cement to 2 parts sand containing 2 per cent. of Medusa waterproofing.

The first and second floor joists are 2 x 8 in. placed 16 in. on centers, while the ceiling joists are 2 x 6 in. also spaced 16 in. on centers. The rafters are 2 x 6 in. placed 24 in. on centers. The floors are single of 1 x 4 in. cypress, and the finish of the rooms is yellow pine stained.

The ceilings on the first and second floors as well as all partitions of wood construction are covered with No. 1 white pine lath. All walls and ceilings of the first and second floors are plastered three coat work.

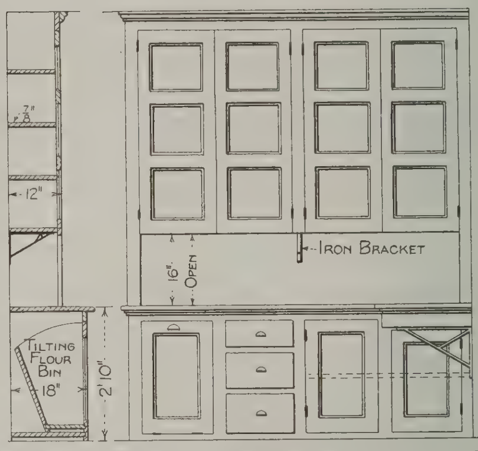
The bath room has a wainscoting of Keene's cement marked off in 4 x 4 in. blocks and consisting of three coats common flat and two coats enamel. The bath room is equipped with tub, closet and wash basin made by Kohler & Son.

The front door is of oak and is fitted with plate glass. All inside doors are of the five-panel type made of yellow pine natural finish.

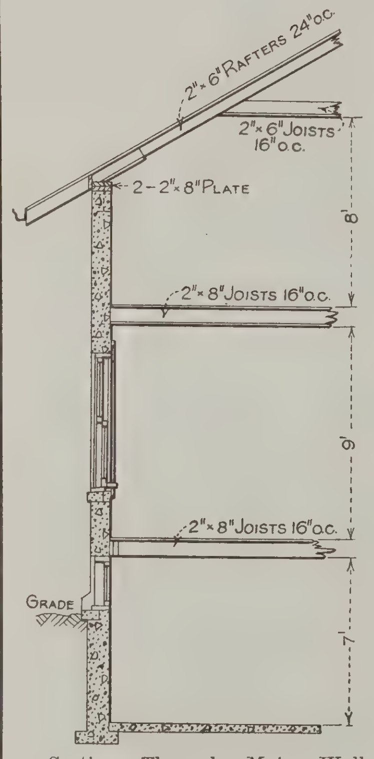
The cupboard in the kitchen is arranged with doors, drawers, shelves, flour bin, etc.

All outside work received a priming coat and a final coat. The interior received one coat surfacer and two coats varnish, excepting the main rooms on the first floor, which received one coat of stain.

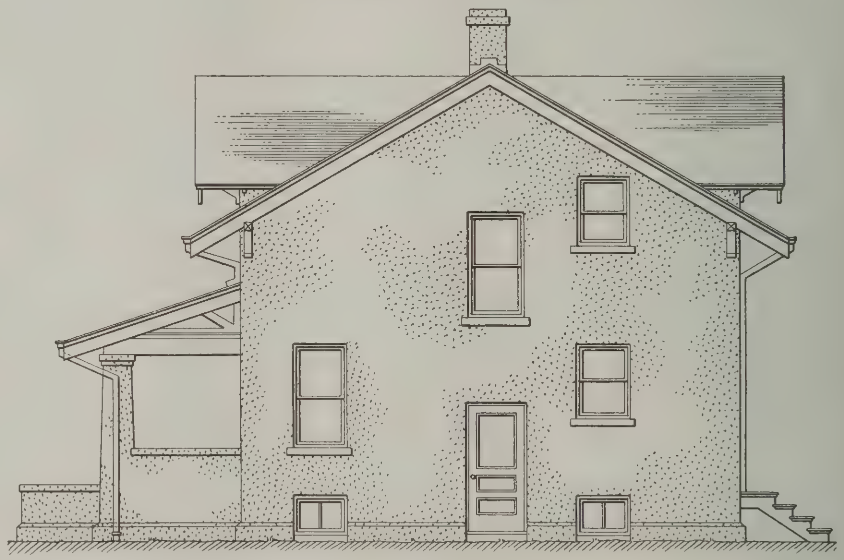
It is interesting in this connection to note the rates of wages paid for certain parts of the work. The carpenters received 42 cents per hour; the plasterers, 50 cents per hour, and the tile setters were paid 60 cents an hour for a 10-hour day.



Details of Kitchen Cupboard—Scale ¼ in. to the Foot



Section Through Main Wall Showing Hights of Stories—Scale ⅛ in. to the Foot



Side (Right) Elevation—Scale 3/32 in. to the Foot

A Hollow Tile Cement-Coated Cottage—Elevation and Various Constructive Details

The cost of the various classes of work was as follows:

Excavation and sewer work	$75
Concrete work including steps	200
Tile work including chimney	375
Cut stone	25
Reinforcing rods	10
Rough lumber	250
Mill work	260
Labor	350
Plastering	350
Painting	75
Tin and galvanized iron work	30
Hardware and nails	30
Asbestos roof	150
Plumbing	210
Incidentals	110
Total cost	$2500

We understand that the above figures include the installation of electric light, gas and water with fixtures and bath room complete, hot water heater and tank in cellar and piping for furnace.

The architect of Mr. Martin's house was Henry C. Millott and the contractor was Alfred Schnurr, both of Sandusky, Ohio.

◆

Plans have just been filed for two six-story apartment houses in West 160th Street, New York City, one of which will cost $300,000 and accommodate 48 families and the other $125,000 and accommodate 42 families. Harold L. Young of 1204 Broadway, New York City, is the architect of both.

Uncertainty in Building Contracts

Effect Where Plans Show Fixtures or Other Features Not Expressly Required to Be Constructed

By A. L. H. Street

WHEN plans made a part of a building contract show that shelving, showcases or other fixtures are contemplated as a part of the building, the agreement should be so clearly worded that no doubt can arise as to whether it is understood that the contractor shall construct them as a part of the work. Plans often show features of this kind for the purpose of enabling the builder to more intelligently perform his contract, without intent of either party that the builder shall construct them. But, if this intent is not clearly manifested, the builder may find himself confronted by a claim on the part of the owner that, because the plans show the fixtures, they were contemplated as part of the work. This is the situation in which the builder found himself in the recent case of Corbin vs. Milward, 164 Southwestern Reporter, 574, which was passed upon by the Kentucky Court of Appeals. He absolved himself from liability, but at the expense of a hard-fought lawsuit which it proved necessary for him to carry to the Court of Appeals, when less than a dozen words in the contract would have avoided the dispute.

A Contract Which Was Defective

Mr. Corbin, a builder, contracted to erect a building to be used as an undertaking establishment. The agreement contained a clause reading as follows:

> "INSIDE FINISH.—All inside finish in main and private office and showroom and hall on second floor to have quarter-sawed oak, inside casings, base, stools, and aprons, carpet sills, etc., *this also includes the cases, complete, in showroom, all as shown by the detail drawings.* All to be hand cleaned, and put up by experienced workmen; all other finish throughout the plastered rooms to be of clear yellow pine as per details."

There is a dispute as to whether the italicized words were stricken out, but the court disposes of the case without regard to this controversy.

The plans were made in sections, and also constituted a part of the contract. The room in question was on the second floor, and was to be used for the purpose of exhibiting coffins. It was designated upon the plans as the "showroom," and its general outline or floor plan only was shown. The only thing shown by the plans, beyond the walls and openings, was a line drawn on the floor plan which indicated that three spaces next to the wall, and marked "cases," were to be used for that purpose. The floor lines, and word "cases," and the phrase, "no hardwood finish under cases," written upon the face of the plan, constitute everything that appeared upon the original plans furnished Mr. Corbin for the purpose of making his bid, and constitute the details of the plan over which this controversy arose. He claims that the notice, "no hardwood finish under cases," explains why the lines and the word "cases" appear on this plan, and that it was merely to show that there was no hardwood floor to be put in these spaces, since the lines and notice shown by the plan gave no data or information whatever as to the size, material, or character of the coffin cases.

When the building was almost completed the builder was first apprised that the owner claimed that he must install the cases, and then detail drawings were furnished for that purpose. The contractor denied any obligation to install the cases, whereupon the owner had them installed at a cost of nearly $1,000, and claimed the right to deduct the amount from the price of the building. In the litigation that followed the trial judge divided the cost of the cases between the parties, holding that the contract was so confused that it could not be determined whether the builder was bound to provide the cases. But Mr. Corbin's appeal to the Court of Appeals procured a reversal of the judgment and an order for payment of the full contract price.

What the Court Held

The important parts of the opinion on appeal read as follows:

"The contract either required Corbin to furnish the coffin cases, or it did not require him to do so. . . . None of the contractors who bid upon the work would say they could make an intelligent bid upon the cases from the plans and specifications. . . . The substance of Milward's claim is that he verbally informed Corbin all about the cases. Corbin, however, contradicts Milward, and, the contract being in writing, it must control. . . . Furthermore, some attempt has been made to show that it is customary for contractors to bid generally upon work to be done according to details subsequently worked out and furnished to the contractor, and that the specifications, in another clause, provide for such 'additional drawings and specifications as may be necessary to detail and illustrate the work to be done.' But this provision does not strengthen appellee's position, since it, no more than the former clause quoted, provides what work is to be done. . . . It is plain that the specifications did not show sufficient or definite plans, either in the aggregate or in detail, to enable a bidder to know what could be expected of him. There is nothing to show of what material the cases were to be made, their size or finish, or whether they would cost $100 or $1,000. . . . Indeed, we might have rested this question of fact opon the opinion of the chancellor, in which he said: 'What these cases would cost could have been nothing less than a bare conjecture so far as the specifications are concerned. They could have cost $2,000 as easily as $1,000. They could have been furnished with plain or plate glass, or the doors could have been of plain wood. They could have had pine columns or mahogany, or no columns at all. They could have had backs or no backs, partitions or no partitions."

The court cites a similar case (Sexton vs. City of Chicago, 107 Illinois Supreme Court Reports, 330), wherein it was held that a contract for the erection of a building did not require the builder to furnish skylights shown by the plans. In that case, the original plans showed openings for skylights, but nothing as to the size, weights, or data concerning the lights. In holding that the skylights were not included in the contract, the court said:

Skylights Not Included in Contract

"The entire work was to be done according to said plans and specifications, and upon turning to them, so far as they relate to the skylights, we find they show the openings and iron framework constituting the foundation for five skylights. We also discover certain lines passing across the openings which indicate that skylight superstructures of some kind were ultimately intended for the building; but no sizes, weights, or data are given to guide one, either in their construction or in estimating their cost, except the size of the openings. Had the appellant been forced to construct skylights under the circumstances, he would have been compelled to have either gotten up an additional plan and specifications for his employees to work by, or the city would have had to furnish them, in neither of which cases would they have been constructed according to the plans and specifications on file in the appellee's office at the time the contract was entered into."

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Authority to Employ Architect

A corporation is not liable on a contract employing a firm of architects to prepare plans for a building, if the agreement was not authorized by the Board of Directors and if the proposed building would involve an expenditure largely in excess of the capitalization of the company. This is, in effect, the decision announced by the Appellate Term of the New York Supreme Court in the case of Thompson & Frohling vs. Marseillaise French Baking Company, 147 New York Supplement, 402. Plaintiffs, a firm of architects in New York City, sued for $700 as compensation for preparing plans for a building to cost $125,000. Defendant company defended the suit on the ground that its president, with whom the contract was made, had no expressed or implied authority to contract concerning so expensive a building when the capital stock of the corporation was only $10,000, especially in view of the fact that the land on which it was proposed to erect the building, did not belong to the company. The Appellate Term sustained this defense, declaring that the making of such a contract was not within the scope of the president's general authority, and that plaintiffs were bound to take notice of the limitation upon his authority in this respect.

The Lumbermen's Building and House of Hoo-Hoo at the Panama Exposition

One of the interesting features of the Panama-Pacific International Exposition which opens in San Francisco, February 20, 1915, will be the Lumbermen's Building and House of Hoo-Hoo, the architect of which is Bernard R. Maybeck of the city named. The building will be located in the midst of the Horticultural Gardens just south of the Horticultural Palace, an illustration of which appeared in these columns last month. It will be near the main entrance to the gardens where it will attract the attention of visitors while serving as a special magnet for the lumbermen for whom it will be headquarters and to whom it will particularly appeal. The architect's design calls for a skillful combination of trees, shrubs, ferns, moss, bark, lumber, shakes, shingles and logs. The columns of peristyle and pergola will consist of logs of all the commercial species of the coastal states ranging in diameter from 24 in. to 40 in. Within the building manufactured lumber will be exhibited, this including California redwood, Oregon spruce, sugar and white pine, white cedar, Douglas fir, hemlock and red cedar.

The interior will be fitted up for the combined purpose of providing homelike surroundings with rest rooms, writing rooms, smoking room and assembly room and showing all the coast woods in the most approved manner. There will not only be built-in exhibits but by means of ingenious pivotal devices opportunity will offer for interested retail lumbermen to definitely handle and inspect sample boards s1s, in size 1 x 12 in. x 16 ft. suitably marked, of each grade in sugar and white pine, redwood and fir. This feature of exhibiting sample commercial boards proved one of the most practicable of the exhibits of the Forest Products Exposition in Chicago and New York as demonstrated by the Western Pine Manufacturers' Association.

◆

Salem's New Building Code

The new building code which was adopted the third week in August by the Rebuilding Commission of the city of Salem, Mass., specifies that for structures which may be erected on the burned district, the roofs must be of slate, tile, terra cotta, metal or some other equally incombustible material. The code allows for factory and mill construction, but these buildings must be of first or second-class construction or built with a mill frame and an exterior of metal or other incombustible material.

In regard to the residential section the Code reads as follows:

"No building will be allowed to run nearer than 5 ft. to the adjoining lot, and there must be a distance of at least 10 ft. between buildings on the same lot. No building shall occupy more than 75 per cent. of the lot on which it is built, unless it be on a corner, then it may occupy 80 per cent. of the lot."

The new regulations apply only to the burned district.

◆

Wood block flooring for factory buildings is receiving much favorable comment at present.

A Hillside Country Club House

A Hollow Block Construction with an Exterior Finish of Cement Stucco—Cost About $6000

THE country club house which we illustrate herewith is located on the bluffs overlooking the Mississippi River. Its walls are of hollow clay blocks coated on the outside with cement stucco and having a "pebble dash" finish. The footings are of concrete. The porch floors are of reinforced concrete, tile and joist system, with finish floors of narrow ⅞ in. fir laid on strips bedded in the concrete.

The timbers used in the building are of a good quality of pine. The roof is sheathed with 1 x 6 in. dressed boards laid 3 in. apart and covered with red cedar shingles exposed 5 in. to the weather. Before laying they were treated with Cabot's shingle stain, made by Samuel Cabot of Boston, Mass.

The floors are of straight grained Southern yellow pine and the interior trim is of stained Southern yellow pine. The hardware is of heavy wrought bronze, old copper finish Colonial design.

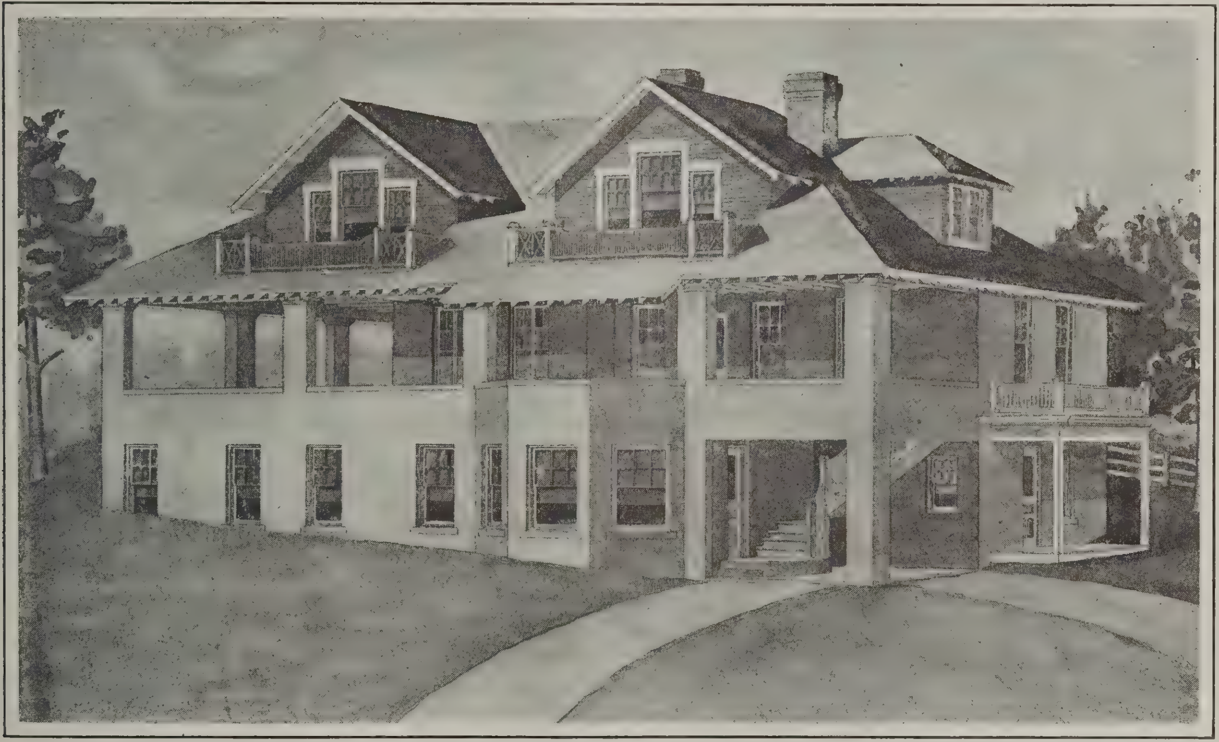
The building is heated by steam and the plumbing fixtures installed in the bathroom, toilets and kitchen are of the modern type.

On what is designated as the ground floor is located the dining room, the grill room, the kitchen and four bedrooms, two of which are intended for use of club members. The heater and fuel room is also located on this floor as well as the men's toilet and shower bath.

On the main floor are the clubroom, 15 x 23 ft. in size, two club bedrooms, the bathroom and the ladies' toilet. The veranda extends entirely across the front of the building and around one side, its width varying from 11 ft. in the narrowest place to 17½ ft. in the widest.

On the upper floor are three club bedrooms with balconies which may be used as sleeping porches if so desired.

The Hillside Country Club House here shown was designed by Architect E. A. Payne, of Carthage, Ill., and cost to erect $6,000 a little more than a year ago.



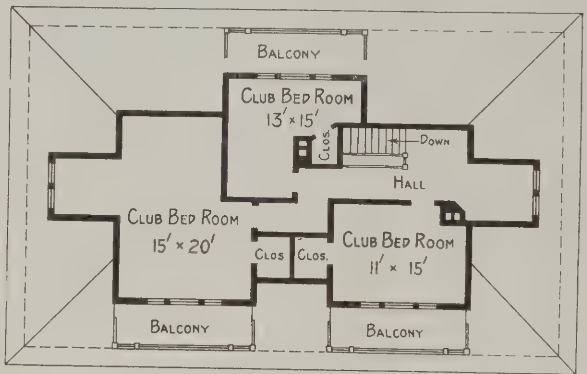
A Hillside Country Club House—Architect, Edgar A. Payne, Carthage, Ill.

Fire Prevention

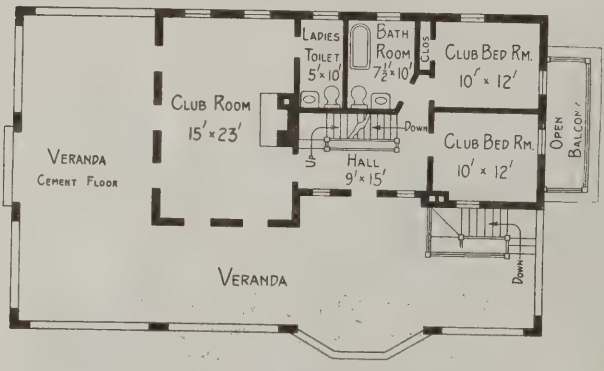
In commenting upon the recent destruction by fire of a magnificent country house on Long Island, N. Y., and dealing at some length on the inertia of the Americans in fire prevention, a writer in the *Evening Post* offers the following remarks:

Fires starting in the cellar or basement of large country houses, hotels and public buildings, and resulting in their complete destruction, are matters of constant occurrence, and occasion no surprise. Yet the adoption of measures entirely within the reach of owners of such buildings—whether private individuals, stock companies, or public bodies—and entailing only a very moderate expense, would suffice to make such disasters virtually impossible.

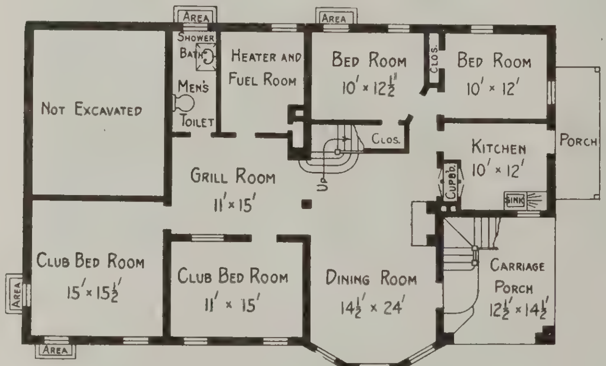
Even fireproof construction of buildings as a whole has been so reduced in cost in recent times that the difference between the price of such a building and that of the ordinary inflammable kind is far from being so serious as it formerly was. But without going to that expense, the risk of fire from the causes to which fires in buildings of the kind we have been referring to are most frequently due can be reduced to an almost insignificant fraction of what it now is. The great thing to be aimed at is the isolation of the fire, the prevention of its spread from the point at which it originates. This can be accomplished, as regards the cellar furnace and its neighborhood, by fireproof floor construction separating the cellar from the first story. A concrete or steel-and-tile floor can be easily put in at an increase of cost over ordinary wooden joist construction that would hardly be noticeable in the total cost of a large building. In addition to this, and especially in places where the services of a fire department cannot be promptly obtained, the installation of some simple system of automatic sprinklers in basements, near the heating apparatus, and also in kitchens and laundries, commends itself as an obvious safeguard, and offers no great difficulty in the way of expense.



The Second Story Plan



Plan of Main Floor



Ground Floor Plan

A Hillside Country Club House—Floor Plans—Scale 1/16 in. to the Foot

Another most effective measure of protection is the erection of a fireproof division wall, cutting the whole house into two parts. Such a wall may be built of brick or concrete, and would run right through the house, from cellar to roof; it would be provided with concealed sliding metal doors at all openings, and could be entirely hidden within partitions, so that it would be in no way noticeable and would not mar the artistic effect of the residence. Such a wall would not only be a fire-stop, but also be an invaluable life-saving device. It is on this account that the recent factory legislation so strongly discriminates in favor of buildings with fire walls of this nature. We are informed, on excellent authority, that a wall of this kind, even in large country houses or hotels, would rarely add more than a thousand dollars to the cost of the building; and it would be a sure means of preventing the spread of flames from one part of the building to another.

What makes our inertia in these matters the more remarkable is the fact that information about them is not only available, but is accessible in exact and authoritative form by mere application to a well-known national organization devoted exclusively to the promotion of better methods. By merely writing to the National Fire Protection Association, which has now been in existence nearly 20 years, with its executive office at Boston, anyone may obtain without cost the results of the experience of competent experts on every aspect of the problem of fire prevention. The Association has issued a great number of pamphlets, in which are laid down the standards which have been found desirable in regard to almost every point concerning safe construction, and protection against fire. Failure to adopt these standards, or indeed to give anything like adequate thought to the question, can but be regarded as an instance of that easy-going disregard of comparatively remote danger which characterizes the national temper in so many directions. It may be quite true that this is a "defect of our qualities"; but that does not prevent it from being a serious defect, or from working out grave consequences, whether in such a matter as the fire danger or in the broader questions of politics.

◆

Since the middle of August a vigorous campaign has been waged by the city of Boston looking to the elimination of the fire hazard. As reported by the fire commissioner 80 per cent. of the fire losses are preventable and the objective of the work of the present campaign is not so much the minimization of fires and their speedy extinguishment, as it is the elimination of the conditions which make these fires possible and probable.

◆

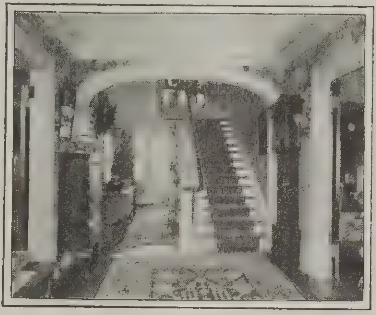
There are said to be more than 400 different kinds of marble used in New York City, and in color they range from bright reds and greens to the most delicate shades of pink, turquoise and yellow. Some are known as dead stones because of their flat, sombre hues, while others are alive with dashes of vermillion, scarlet, emerald green and lavender.

Specifications for Wiring a Dwelling

A Typical Set of Plans and Specifications for the Wiring of a Residence of Average Size

THE dimensions of the house, excluding verandas, are 38 x 26 ft. outside measurement, but it is not expected that the plans will coincide with the individual tastes or requirements of every house builder. They represent, however, a fairly ideal installation taking into consideration the comfort and requirements of the average citizen. Mention is made of a number of features which, without adding appreciably to the cost of the installation, greatly assist in perfecting the refinements of control and make for convenience and economy of operation.

(1) Absence of brackets—It will be seen that there are practically no wall outlets, these being confined to the one in the pantry, one in the attic hall and one in each of a number of closets. Even in these isolated cases a little added expenditure would have been justifiable and have made the installation, in our estimation, still more perfect. The idea is, however, that all brackets shall be controlled by pull chains, these being especially satisfactory for the closet lamp which is intended to be installed immediately above the doorway, with the chain hanging three or four inches below the frame; this can be picked up easily in the dark by running the hand along the top of the frame. The objection to brackets is daily becoming more universal. They are generally in the way of furniture or decorations; they collect dust and dirt; they engender untidiness as they are often used as hooks, and at best they only localize the light. All the advantages of the wall lamp, without the disadvantages, are found in the baseboard receptacle, of which these plans show a liberal number.



(2) Arrangement of circuits—The baseboard receptacles in this plan are kept on separate circuits by themselves. This arrangement gives two circuits in every room, so that in the event of an interruption on one circuit the room will not be left entirely without service, and a fuse being blown by a fault developing in a worn flexible cord will not interrupt the lighting of any regular ceiling outlet. This gives a somewhat larger number of circuits than is absolutely necessary and takes a few feet more wire, but it has the advantage of allowing a liberal capacity on every circuit so that if an unexpectedly large load is taken from any outlet that circuit is not likely to be dangerously overloaded.

(3) Special closet outlets—As already noted, a small wall lamp is provided above the door in each closet. The additional expense for these outlets is very small, the current consumption will be negligible and the added convenience, especially in closets the shape of those shown, is very material indeed. Especially where clothing or supplies is placed on shelves a good lighting is necessary to maintain a proper tidiness. Such a light in the medicine closet will tend to prevent the use of carbolic acid for castor oil.

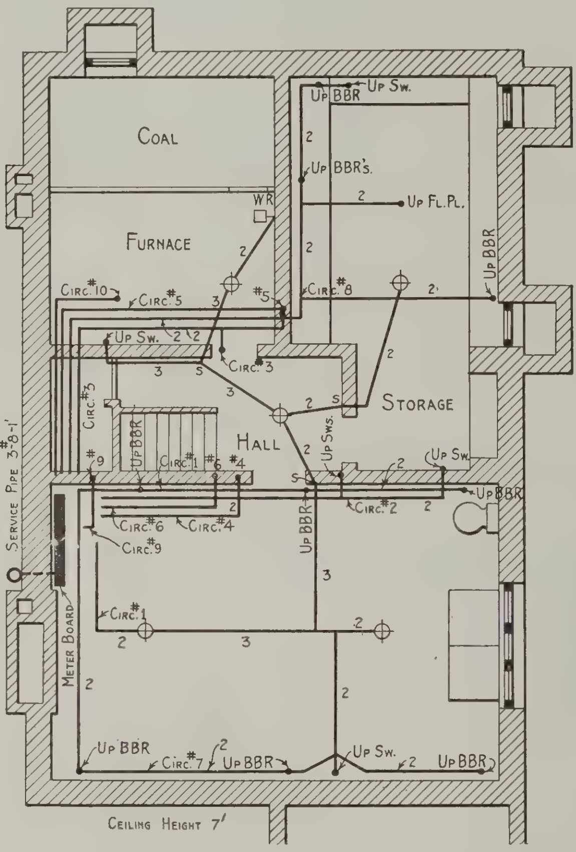
(4) Switch controls—The arrangement of switches in the main halls would appear to be especially convenient without over-elaboration. It will be noted that the lamp in the lower hall is controlled by three switches consisting of the usual two three-ways, one upstairs and one down, and an extra three-way downstairs placed in series with the other two and which acts as a selective switch. This makes possible the use of either a small light or a brilliant light, as desired, a small lamp being considered sufficient in most halls the greater part of the time. Three-way switches are not installed to control the attic hall light though this is a convenience many householders would add.

The dining room light is controlled by a two-point electrolier switch which admits of low light being used for setting and clearing the table. The rear entrance light is operated from the same switch as the basement hall, it being considered that the former will rarely be needed except when going down cellar, and also that it will serve as a pilot to show when the basement light has been left burning. The intermediate landing light is also controlled with the upper hall, since this will be a small wattage lamp and is generally needed when the upper hall is needed. Electrolier switches for the living room, though not installed in this plan, would probably be considered essential in the average case as they would make possible better general control of the illumination as, for example, when a number of localized lamps are being lighted from the baseboard receptacles and the full ceiling illumination is not required.

(5) The service is made heavy enough to stand the addition of an electric range. Though in this particular case the wires have not been installed, this is only because their installation at a later date will be an exceedingly simple matter.

(6) Ironing outlets—In the back verandah and in the kitchen, where ironing is most likely to be done, outlets have been placed high (6 ft. from floor), so that the ironing cord will not interfere with the work. These outlets are equally valuable for any other apparatus.

(7) Baseboard receptacles—A liberal number of baseboard receptacles are installed at convenient places. These will carry lamps, toasters, water heaters and, above all, small electric heaters for spring and autumn use before the furnace is operating. A receptacle has been placed on the front verandah as this, if windowed, is most likely to be the place where an afternoon tea or a lazy breakfast will be served. The floor plug in the dining room is also calculated to supply a sufficient number of electric utensils to cook a small meal. The plan suggested is to connect a plug in the floor with two or more flush plugs at convenient points in the table. The unsightly appearance of a number of cables hanging from your electrolier is thus avoided. The floor contact also is a permanent one and need only be removed in case the table is to be moved a considerable distance. The two additional baseboard outlets at the sideboard and buffet will admit either of decorative lighting or frying operations which might spoil the table linen.



Specifications for Wiring a Dwelling—Basement Plan

(8) It will be noted that no provision is made in the hall for the operation of an electric sweeper. It may be contended that the liberal distribution of baseboard outlets in the various rooms would serve this purpose, but we believe it would be better to have a separate power outlet for each hall so that the stairways especially may be reached. This is particularly true of the upper flat, where baseboard outlets in the different rooms have not been specified. A hall outlet will, in this case, serve to operate a vacuum cleaner at any point on this flat. It may be contended that in the strictly modern house a stationary vacuum cleaner should be installed, but we believe it is open to question whether a house of the size represented here would be justified in including what may yet be considered as something of a luxury. Much will depend, of course, on the method of furnishing to be adopted. With the modern fairly general unpopularity of carpets and their replacements by small rugs the necessity of the large vacuum cleaner is not so apparent.

(9) No mention is made in the specifications of wiring for bells or annunciators, but this is a matter about which individual tastes differ very widely. In the particular house under discussion we have been given to understand that the front door is connected with one bell and the back door with another; also that the dining room and living room are connected to a (the same) buzzer. In a house of this size upstairs bells hardly seem to be necessary though some householders prefer one push button at least upstairs, which might, in this case, be connected with the front door bell. In the dining room connection is made with a push button in the table through a floor outlet, and a push button in the living room is so located that it is easily accessible from the front veranda. Again it is a matter of individual taste whether these bells should be operated off batteries or a transformer. The strictly modern installation would use the transformer, but where small economies are a consideration it is possible the batteries will be favored.

SPECIFICATIONS

These specifications are intended to cover the supply of all necessary material and labor for the installation of a complete wiring system for lighting, etc., in the new residence for...............

Working Conditions

1. House is built and roofed but not finished. Electrical work may be started immediately.
2. House is of standard brick construction.

Plans

Plan No. C-38 shows the "Wiring Plan of Residence" and shall be considered as forming an integral part of these specifications.

Circuits are indicated by single heavy lines, the number of wires in each run being marked by small numbers.

In all cases, circuits are located between the ceiling of the floor on which they are shown and the floor above.

Detail Specifications

1. Install standard service pipe in rear of house, as shown, same to consist of three No. 8 wires and 1-in. conduit.
2. Install meter board 3 ft. wide by 2 ft. high covered with a clear sheet of ¼-in. asbestos painted black.
3. On meter board install one 3 p.s.t., 250-volt, 60-amp. knife switch and five three to two wire double-branch fuse blocks with fuses and make all necessary connections ready for meter.
4. Install 10 branch circuits throughout the house as shown on the plan and detailed in the summary:

Circuit Summary

Circ. No.	Location	Ceiling Outlets	Bracket Outlets	Base Board Outlets	Switches	Watts	Side Service
1.	Basement:						
	Laundry	2	..	..	1	...	R
	Verandah	1	..	..	1	...	..
	Hall	1	..	..	..	...	..
	Rear entrance	1	..	..	1	440	..
	Storage	1	..	..	1	...	..
	Furnace	1	1W.R.	..	1	...	..
2.	Ground Floor:						
	Living room	2	..	..	2	...	L
	Porch	1	..	..	1	...	..
	Lower hall	1	..		2 (3w) 1 (El)	460 ...	.. ..
	Upper hall	1	..	..	..	...	..
	Landing	1	..	..	2 (3w)	...	..
3.	Ground Floor:						
	Dining room	1	..	..	1 (El)	...	R
	Coat room	.	1	..	..	...	..
	Kitchen	1	..	..	1	400	..
	Pantry	.	1	..	..	...	..
4.	Second Floor:						
	Study	1	..	..	1	...	L
	Bedroom No. 2	1	..	..	1	440	..
	Closets	.	3	..	..	...	..
5.	Second Floor:						
	Bedroom No. 1	1	..	..	1	...	R
	Bedroom No. 3	1	..	..	1	460	..
	Closets	.	4	..	..	...	..
	Sun room	1	..	..	1	...	..
6.	Second and Third Floors:						
	Bath room	1	..	1	1	...	..
	Toilet	1	..	..	1	...	..
	Bath room	1	..	..	1	360	..
	Upper hall	.	1	..	..	...	..
	Bedroom No. 4	1	..	..	1	...	..
	Bedroom No. 5	1	..	..	1	...	R
7.	Ground Floor:						R
	Living room	1	..	6	..	420	..
	Verandah	.	..	1	..	...	..
8.	Ground Floor:						L
	Kitchen	.	..	1	..	...	..
	Dining room	.	..	2 (1Fl.Pl.)	..	...	..
	Verandah	1	..	1	1	360	..
9.	Second Floor:						
	Study	.	..	3	..	...	L
	Bedroom No. 2	.	..	3	..	360	..
10.	Second Floor:						R
	Bedroom No. 3	.	..	2	..	300	..
	Bedroom No. 1	.	..	3	..	...	..
	Totals	26	11[1]	24[2]	26[3]	4,000[4]	..

---

[1] 2 standard, 8 closet, 1 wall receptacle.
[2] 23 standard, 1 floor plug.
[3] 20 standard, 4 3-way, 2 electrolier.
[4] 2020 R, 1980 L.

Nature of Work

1. All work shall be standard "knob and tube" construction, in all respects of the most up-to-date practice and best workmanship.

2. All wires brought down walls of basement to switches, etc., must be run in metal moulding.

Location of Outlets

1. Ceiling outlets must be accurately located so as to bear a proper relation to decorative detail.

2. Bracket outlets in all closets to be located immediately above the center of the doorways. (It is intended to equip these with pull receptacles.)

3. Other bracket outlets in pantry and top landing to be located 5 ft. 6 in. above floor.

4. Baseboard receptacles to be mounted 6 in. above floor, except kitchen and back veranda, which are 6 ft. above floor.

5. Switch outlet to be mounted 4 ft. above floor unless special wall details require otherwise.

6. In any case where the direction of door swing is reversed from that shown on the plan the switch must be changed to the opposite side correspondingly.

7. Switch outlets located on any paneled wall must be carefully centered.

Control

1. All switches indicated on the plan will be of a standard single-pole type controlling one outlet only, with the following exceptions:

(1) Both laundry outlets to be controlled together by the same switch.

(2) Rear entrance and basement hall to be controlled together by the same switch at pantry door.

(3) Main hall to be controlled by a pair of 3-way switches in lower and upper halls and also with a single button, 3-way switch serving as an electrolier switch.

(4) Upper hall and intermediate landing to be connected in parallel and controlled together by a pair of 3-way switches in lower and upper halls.

(5) Dining room to have a 2-circuit electrolier switch.

Fittings

1. Switches.

(1) Basement switches to be rotary snap switches of approved type.

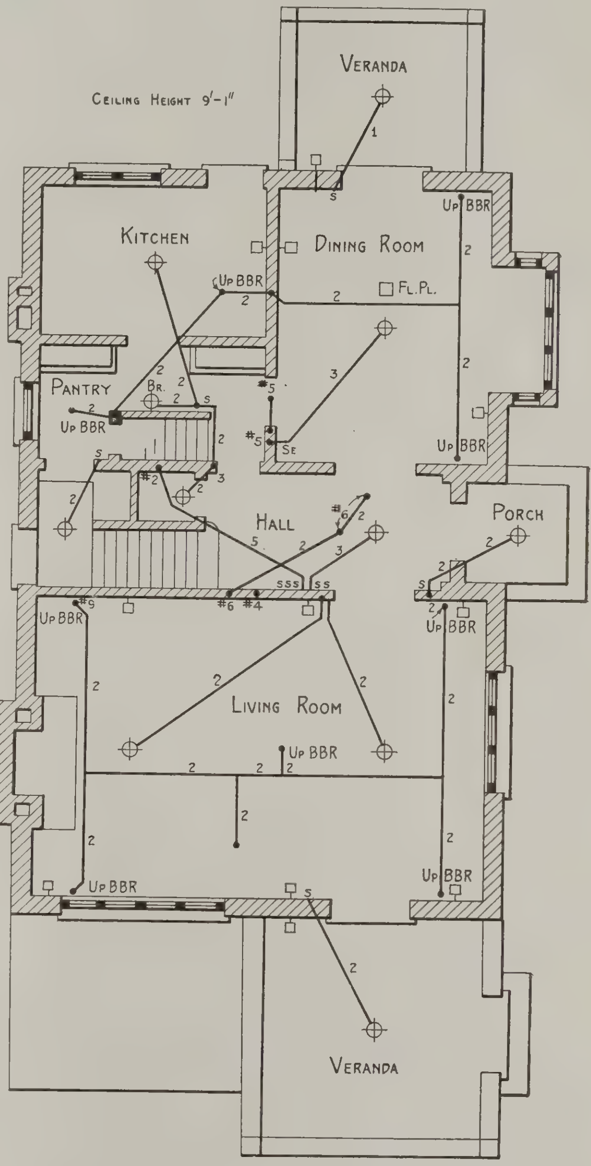
(2) All other switches to be push-button switches of best quality Perkins or equivalent.

(3) Electrolier switch for hall to be a single-button 3-way push switch, Perkins Type O, No. 2458 or equivalent.

(4) Electrolier switch for dining room to be single-button, 2-circuit push switch, Perkins Type O, No. 2460 or equivalent.

2. Switch plates.

(1) All switch plates to be nickel finish unless otherwise required to agree with room hardware.



Specifications for Wiring a Dwelling—First Floor Plan

(2) Upper hall plate to be standard 2-gang plate.

(3) Lower hall plate to be a single plate providing for four two-button switches and one single-button switch, Perkins No. 3655 or equivalent.

3. Baseboard Receptacles.

(1) All baseboard receptacles to be uniform and of best quality Diamond H or equivalent.

(2) No plugs to be supplied.

(3) Finish of face plates to agree with other hardware of room.

1. The "General Conditions" attached herewith shall be considered as forming an integral part of these specifications.

2. All materials and workmanship shall conform to the requirements of the Canadian Fire Underwriters'

Association and their certificate furnished at the completion of the work.

General Conditions

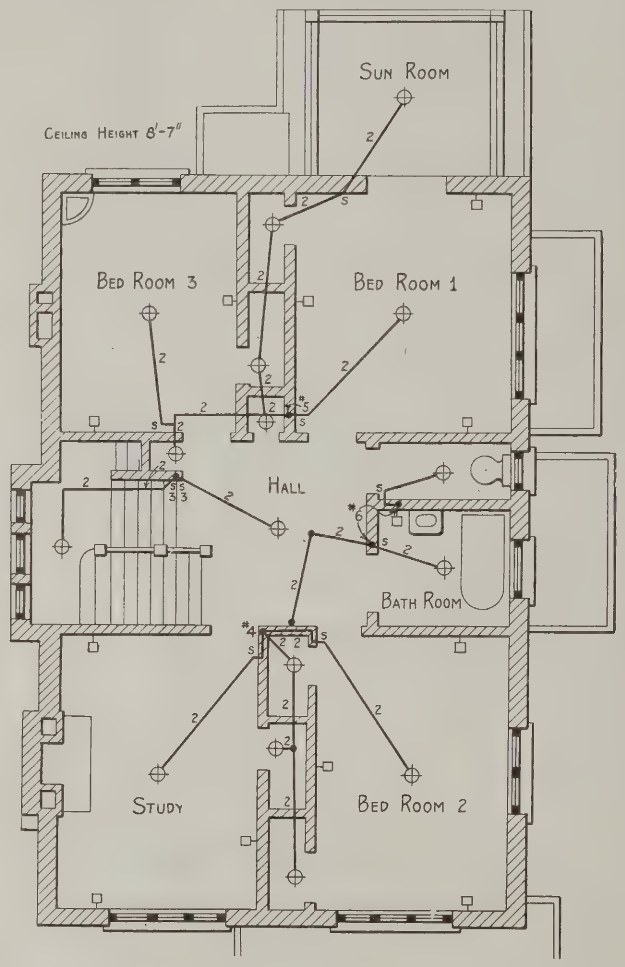
1. These general conditions shall be considered as an integral part of any specification to which they may be attached and shall be binding in carrying out any contract awarded in accordance with such specifications.

2. The following interpretations shall be taken of terms used throughout the specifications:

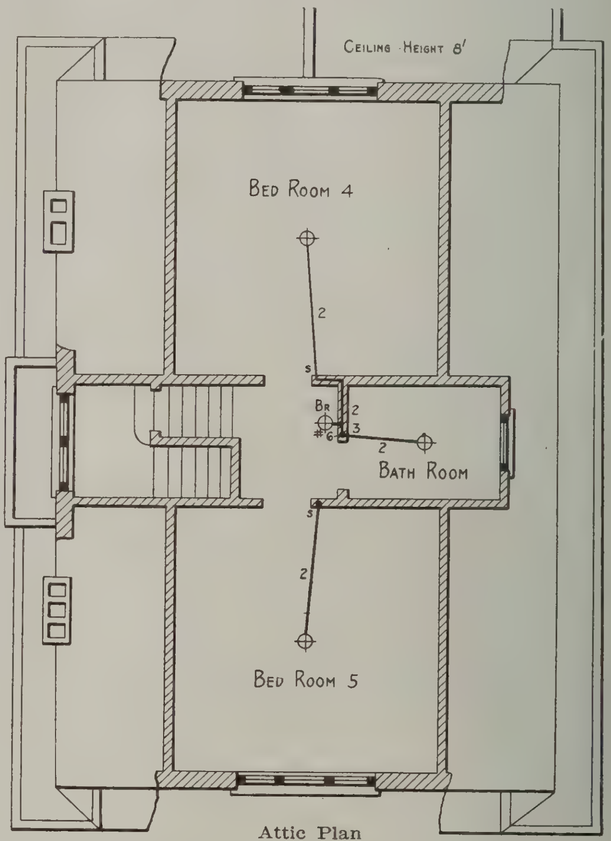
The proprietor means the party or parties who own the building or properties in which the contract is to be fulfilled. In this case..............................

The contractor means party or parties to whom any contract may be let on basis of these specifications.

The architect means the architect or firm of architects under whose charge the building work is being carried on and who is exercising supervision over any or all trades which may be doing their work at the same time as the work called for under these specifications.



Second Floor Plan



Attic Plan

Specifications for Wiring a Dwelling

The engineers mean the engineers who have drawn up these specifications and under whose supervision any contract awarded on the basis of such specifications must be carried out.

3. The contractor (unless otherwise specified) shall provide all material, workmanship, plant, scaffolding, carriages, freightage and every other matter that may be required for the proper performance and completion of the work and the whole of which are to be the best of their several kinds.

4. The plans accompanying these specifications shall be considered an integral part of the same. Specifications and accompanying plans are intended to co-operate, so that any work shown on the plans and not mentioned in these specifications, or vice versa, is to be executed the same as if set forth by the plans and mentioned in these specifications.

5. Should any drawings or figures be omitted in the plans and details which are necessary to a clear, comprehensive understanding, or should any error appear in either plans of specifications, it shall be the duty of the contractor to notify the engineers in writing of such omission or error before submitting tender and in no case proceed in uncertainty with the work.

6. If in the opinion of the contractor a change of plans or specifications should be made for the proper completion of the work, and if such change alters in any way the original amount of the tender, the contractor must notify the engineers and submit price in writing before starting the work, otherwise the engineers will not recognize any change in plans or specifications and no claim for extra payment will be allowed.

7. The plans accompanying these specifications, says the *Contract Record*, are made as accurate as possible, but absolute accuracy of dimensions cannot be guaranteed. No claim for extra payment on account of difference of actual and estimated dimensions shall be allowed unless such difference arises through alteration of building plans by the architect, or unless such difference shall be greater in amount than 10 per centum in each case. On all plans figured dimensions are to be taken in preference to measurement by scale and drawings on a large scale are to be taken in preference to those on a small scale.

8. On all plans, the correct size, location and nature of all walls, partitions or obstructions of any kind are indicated as accurately as possible. If any additional obstacles are encountered the contractor must make good all work through or around such obstacles the same as if they had been originally indicated and no extra claim shall be allowed on account of such obstacles.

9. The contractor shall at his own cost make good any defects, settlements, shrinkages, burnouts, grounds or other faults in his work arising from defective or improper materials which may appear within twelve months after the completion of the contract.

10. The engineers reserve the right to reject any and all materials which in their opinion are unsuitable for the proper completion of the work or not in accordance with these specifications or accompanying plans.

11. Successful contractor shall be required to sign the specifications and accompanying plans as well as revised contract form in which shall be stated manner of payment, time limit, amount of tender, etc.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

An Enterprising Building Contractor

From J. M. Campbell, Siegfried, Pa.—I am enclosing a few snapshots which may prove of interest to some of the readers of *The Building Age*. One picture shows how we hoisted the slate for the roof of the new post office building now being erected in our town, and for which I have the general contract. It was a rather novel sight for the people in the vicinity, as the slate was brought to the building in an Overland Model 49, and we hoisted the 30 squares of slate required for the roof in a little less than 3 hours.

It may also be interesting to know that in the erection of this building I am using an "American" combination contractor's variety saw made by the American Saw Mill Machinery Co., and with it we cut up all odds and ends, also blocking, cornice outlookers, etc., thus leaving no waste behind when the building shall be completed. I am also using it to run out the jambs for doors and windows, and find it a great time saver. The post office is built of hollow cement blocks, turned out on a Palmer machine, and will cost when completed in the neighborhood of $12,500, including the heating system.

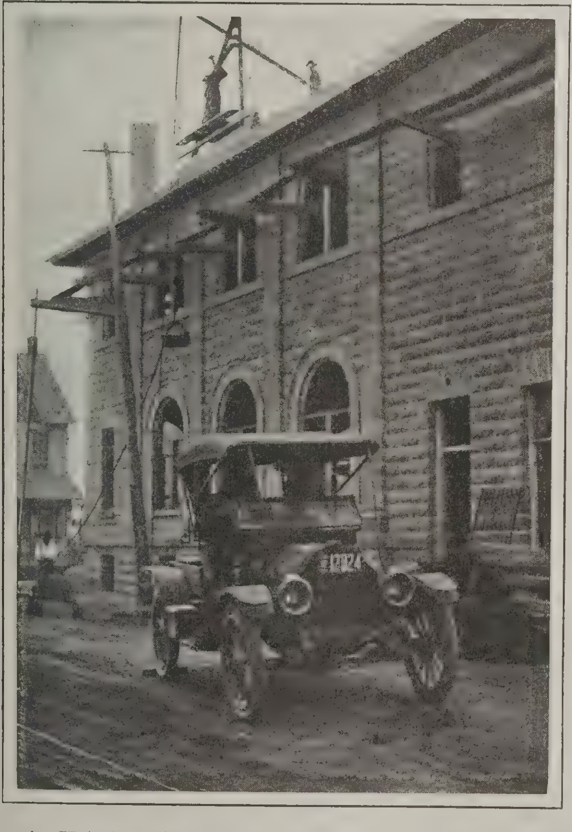


Fig. 1—Hoisting Slate to the Roof of a Post Office Building

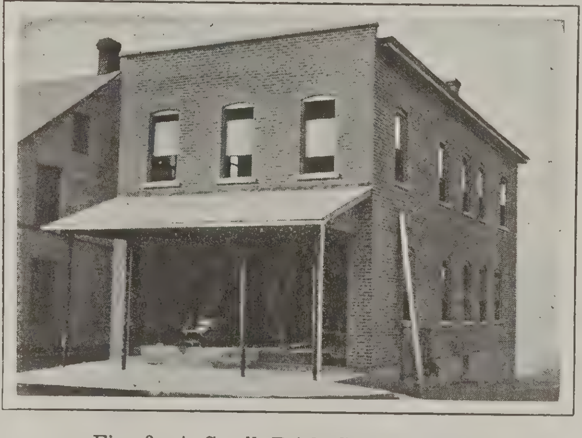


Fig. 2—A Small Brick Store Building

An Enterprising Building Contractor—Examples of Some of His Work

The second picture showing the brick building containing a store room I am erecting on Main street in this town, and it will be completed in a few days, making the total time 63 working days. I take special pride in the completion of this building in the time specified, inasmuch as a competitor of mine started almost a month before on a building located a short distance away and the cost of which is within a few dollars of the one I am erecting. He had the advantage of having the wall and excavation completed when he contracted for the building, while I was obliged to do excavating and build the foundations. At the present time his building is in an unfinished state.

I believe in hustling on a job and gaining time in every way that is possible and do the work well.

More Detailed Information Desired

From Stafford Dames, Nassau, New Providence, Bahamas.—I am a young subscriber to *The Building Age* and am much taken up with the Correspondence Department. For the sake, however, of young men, myself included, who are trying to obtain knowledge of the trade, I wish that the men who are in a position to open our eyes would try to do so in as simple a way as they possibly can.

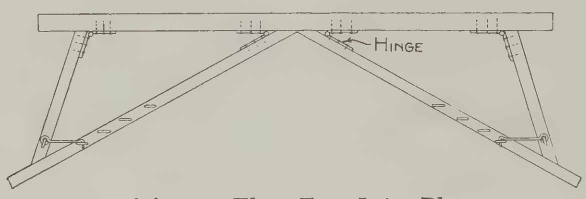
For example, I notice on page 52 of the September issue of the paper a method of obtaining cuts of gable rafters contributed by "E. H.," of Mount Vernon, N. Y., in answer to the query of "W. X. Y. Z.," Westfield, Mass., which appeared in a previous number. With no desire to criticise I am quite sure that there are many beside myself who have not been able to grasp the method there illustrated, simply because it is *not* explained.

I think as we are trying to teach each other, whatever little it may be, that we ought to submit it for publication in as plain a manner as we can. I think if "E. H." would look at the "Comments on Questions in the Correspondence Department" from "R. W. W.," Dayton, N. Y., which appeared on page 50 of the same issue, he will agree with that correspondent when he says "the trouble with many text books is that the writers give a general idea of the work but do *not* go to the beginning and present the details plain enough for the average man to understand or apply them."

I am sure that no average man, and I consider myself one of them, could apply the method given by "E. H." for obtaining cuts of gable rafters. Will the well-informed kindly be a little more explicit?

Raising a Flue Top Into Place

From Contractor, Redford, N. Y.—In regard to the problem of "A. R. E.," Kansas City, Mo., I would suggest that he make a pair of saddles hinged up and adjustable or temporary as indicated in the accompanying sketch. They should be of 2 x 6 in. stuff and 6 ft. or more long. If there is cresting on the roof the correspondent may make his saddle after a McClellan pattern. Place a few short boards on the saddles which will make a platform; set up a step-ladder and for safety lash it to the chimney. Get a light pole of gas pipe long enough to raise the stack above the chimney; attach a light tackle block with half-inch rope and lash the pole to the chimney, giving a little play. Fasten a small rope above the center of the stack and wet it after it is put on if necessary to prevent slipping. The rope may be worked down after the stack is in place.



Raising a Flue Top Into Place

Construction and Strength of Laminated Floors

From Ernest McCullough, Chicago, Ill.—In reply to the inquiry of "H. M.," Centralia, Wash., I would say that the floors inquired about are known as laminated floors. The nominal size determines quantity to be paid for and the actual, dressed, size determines the strength and the amount of waste. Nominal depths of 4 in. and 6 in. have actual dimensions 3/8 in. smaller each way and nominal depths of 8 in., 10 in. and 12 in. have actual depths 1/2 in. less than nominal, a 2-in. thickness nominal being actually 1 5/8 in. The number of feet board measure in a piece of lumber is 1/12 the cubic feet.

The waste in thickness of a 2-in. piece = (2 × 100) ÷ 1.625 = 12.3 per cent. Multiply the length of the room in feet by 1.123 and divide by 6 to get the number of pieces 2 in. (nominal) width. All pieces used should be full length. Add 8 in. to width of room to obtain necessary length of piece. The difference between this length and the nearest (longer) commercial length determines waste due to cutting. For labor allow 1000 ft. B. M. for 2 carpenters and 1 laborer. Use six 20d. nails per lineal foot, for each piece of material.

To determine strength for carrying loads use the following coefficients, nominal depths in each case: 4 in., 15,000; 6 in., 36,300; 8 in., 64,100; 10 in., 103,000; 12 in., 151,500. Multiply the total load per foot wide uniformly diistributed, by the span in feet, to get the proper strength coefficient.

Example.—Live load 40 lb. per sq. ft. Estimate the weight of the flooring (dead load) at 13 lb. per sq. ft. The total load = 40 + 13 = 53 lb. per sq. ft. Span = 16 ft.

W = 53 × 16 = 848 lb.

Coefficient = 848 × 16 = 13,568.

In the table the coefficient nearest this is that for the 4-in. nominal depth. The weight per sq. ft. of floor was on the basis of a 6-in. (nominal) thickness, so the load may be reduced. This gives 2/3 × 13 = 8 lb. (practically), so the total load = 48 lb. per sq. ft., or 768 lb. on the span of 16 ft., one ft. wide.

Before deciding that the 4-in. thickness can be used the safe load must be found that the floor can carry without the pieces splitting along the middle. This would be a failure in shear. The fiber stress used in computing the strength coefficients was 1300 lb. per sq. in. (long leaf yellow pine), and the safe shearing stress = 1300 ÷ 10 = 130 lb. per sq. in. The width must be multiplied by the actual depth; the product by the safe shearing stress and this product by 1 1/3. That is

Safe load in shear = 1 1/3 × 12 × 3.625 × 130 = 755 lb. uniformly distributed. This is close to the actual weight carried, but it is best to use a deeper piece. Using a 6-in. thickness (nominal) the total load = 53 × 16 = 848 lb. The safe load in shear = 1 1/3 × 12 × 5.625 × 130 = 1170 lb., so the 6-in. thickness is O. K.

If the lower side of the floor is to be plastered the deflection must be no greater than 1/360 the span. The allowable deflection = (16 × 12) ÷ 360 = 0.534 in. To find the actual deflection we must return to the original depth, which was found to be all right with a definite fiber stress. Divide the square of the span in feet by 44 × the actual depth in inches.

Def. in in. = (16 × 16) ÷ (44 × 3.625) = 1.6 in.

To find a depth which will give a deflection not exceeding the allowable deflection multiply the actual deflection by the cube of the actual depth; divide by the allowable deflection; extract the cube root of the result.

$$h = \sqrt[3]{\frac{1.6 \times 3.625^3}{0.534}} = 5.21 \text{ in.}$$

It will be safe to use nominal 2-in. × 6-in. pieces.

How Mill Work Should Be Listed

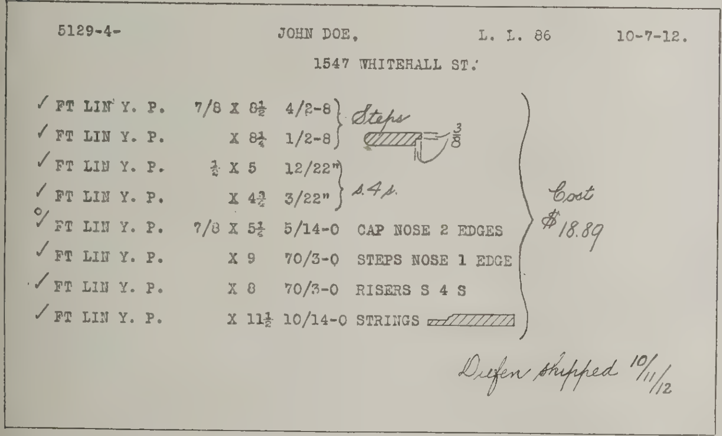
From John Wavrek, Jr., Pa.—Supplementing what appeared in the June issue under the above title I offer the following comments which may not be without interest. In the issue of the paper in question I outlined my method of taking measurements and listing data for the planing mill, two of the slips illustrated showing the method of taking the measurements on the job for which the mill work was to be made and the others showed how the data is written out for the mill.

These slips, however, are not used in the mill from which to get out the work, but in the office to copy the different items, which are written out with especially large lettering on the typewriter as shown on the accompanying specimen slips, Fig. 1.

First, all the items are copied on numbered loose leaves which are filed in the office and when the goods are to be delivered they are given to the teamster and checked off by the shipper with dates marked showing when certain goods were sent.

The firm for which I am working, and which is one of the largest of its kind in eastern Pennsylvania, has in operation the system I am describing, and it certainly gives great satisfaction; in fact, I know of no better one.

The slips which I write out on loose-leaves are given numbers. For example, beginning on January 1 we start out with No. 1 for the first order and by December of the same year the numbers are usually up in the 6000. We will assume that the number for the work on this job is 6000 and the slips or loose-leaves would therefore read No. 6000 John Doe, L.L. 46, and if there are more loose-leaves for the same job they are numbered consecutively, thus No. 6000, L. L. 47, and so on. A file is kept having the names of the different customers in alphabetical order and each different job of the various contractors has a separate file card.

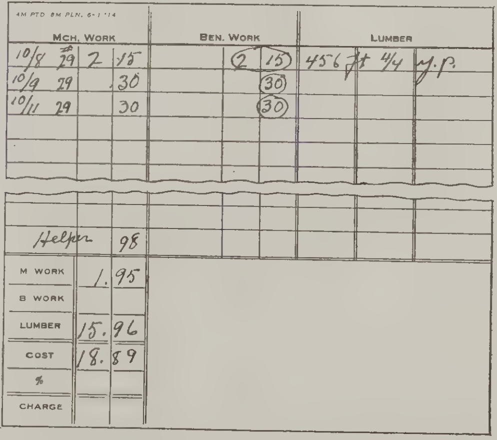


5129-4- JOHN DOE, L. L. 86 10-7-12.
1547 WHITEHALL ST.

✓ FT LIN Y. P. 7/8 X $8\frac{1}{2}$ 4/2-8
✓ FT LIN Y. P. X $8\frac{1}{4}$ 1/2-8
Steps $\frac{3}{8}$
✓ FT LIN Y. P. $\frac{1}{2}$ X 5 12/22"
✓ FT LIN Y. P. X $4\frac{3}{4}$ 3/22"
S 4 S.
✓ FT LIN Y. P. 7/8 X $5\frac{1}{2}$ 5/14-0 CAP NOSE 2 EDGES
✓ FT LIN Y. P. X 9 70/3-0 STEPS NOSE 1 EDGE
✓ FT LIN Y. P. X 8 70/3-0 RISERS S 4 S
✓ FT LIN Y. P. X $11\frac{1}{2}$ 10/14-0 STRINGS
Cost $18.89

Diefen shipped 10/11/12

Fig. 1—Specimen Slip Used In Office From Which to Copy the Different Items



4M PTD 8M PLN. 6-1-'14

MCH. WORK				BEN. WORK			LUMBER		
10/8	#29	2	15		②	⑮	456 ft	4/4	y.p.
10/9	29		30			㉚			
10/11	29		30			㉚			
Helper			98						

M WORK	1.	95
B WORK		
LUMBER	15.	96
COST	18.	89
%		
CHARGE		

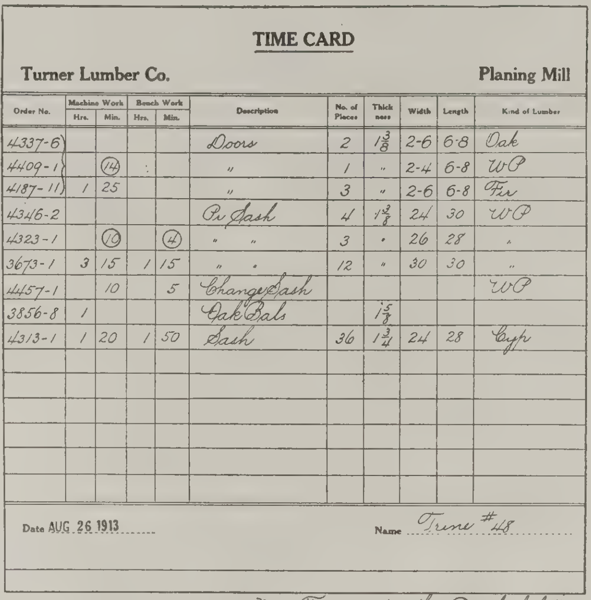
Fig. 2—The Back of Slip Shown in Fig. 1

How Mill Work Should Be Listed—By John Wavrek, Jr.

For the various kinds of work, cards of different colors are used; thus for window and door frames the color is yellow; for sash and transoms it is blue; for shutters, green; for blinds, salmon; for ⅞-in. doors and dressers it is pink, and for doors 1⅛ in. and over it is white. There is never more than one thickness of doors or sash written on one slip. For miscellaneous work red slips are used.

Three slips are made of one kind, one of which is ruled on the back in such a manner that the cost of the items appearing on its face side may be determined as in Fig. 2. This slip is placed on file in the office and the time is put on the back every day until the work appearing on its face side is completed. The lumber tally, which is taken from the shop slip, is added and when the time and lumber are figured out the mill cost is found.

The other slip, of which the one just described is a duplicate, goes to the workmen and stays in the shop until the data appearing on its face is completed. It is then given to the foreman, who in turn takes note of the work appearing thereon and then hands the slip into the office, where the lumber tally is taken off. The fact that this slip is returned to the office is proof that the items it contains are finished and ready to be sent out.



TIME CARD

Turner Lumber Co. Planing Mill

Order No.	Machine Work		Bench Work		Description	No. of Pieces	Thickness	Width	Length	Kind of Lumber
	Hrs.	Min.	Hrs.	Min.						
4337-6					Doors	2	$1\frac{3}{8}$	2-6	6-8	Oak
4409-1		⑭			"	1	"	2-4	6-8	W P
4187-11	1	25			"	3	"	2-6	6-8	Fir
4346-2					Pr Sash	4	$1\frac{3}{8}$	24	30	W P
4323-1		⑩		④	" "	3	"	26	28	"
3673-1	3	15	1	15	" "	12	"	30	30	"
4457-1		10		5	Change Sash					W P
3856-8	1				Oak Bals		$1\frac{5}{8}$			
4313-1	1	20	1	50	Sash	36	$1\frac{3}{4}$	24	28	Cyp

Date AUG 26 1913 Name Trine #48

Note: Time marked thus ⑭ is for helper

Fig. 3—Shop Men's Time Card

Whenever inquiries are made as to how far certain work is advanced reference is made to the back of the cost card and a report of its progress can be made therefrom because the time of the different workmen is noted thereon.

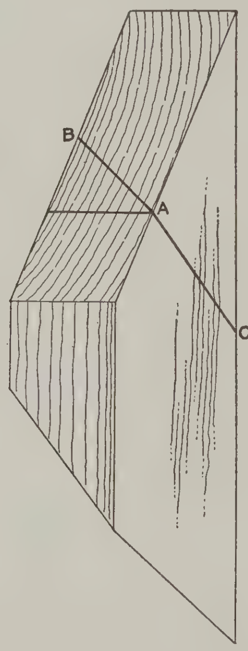
The third slip, which is exactly like the first two, goes to the shipper's file. When goods are shipped the shipper checks off the different items and sends the slip into the office. The fact that the shipper's slip is checked off and the teamster's name written thereon is proof that the items appearing on the slip have been sent. Thereupon the cost slip is taken out of the file, the cost is figured out and entered into the ledger, after which bills are sent to the customer for the goods. After goods are shipped the slip is also checked off on an index card—a new one being made every year.

The three cards being typewritten in one operation with sketches added thereto, makes them exactly alike and in case one is lost it is possible to find its duplicate.

The accompanying sketches show the various slips which I have here described, also the shopmen's time card, Fig. 3, which is given the men each day and collected as often. The fact that this system has been used by the firm in question for a number of years is proof that it is a good one. However, there may be a better one and I would be glad to hear of such.

Obtaining Cuts of Gable Rafters

From G. S. Crosby, Pacific Grove, Cal.—In answer to the correspondent whose query appears under the head of "Drafting with the Steel Square" and published in a recent issue of the paper, I desire to offer a few comments. First, cut the top of the rafter of the small gable. Upon this cut face set the rise of the main roof from *A* to *B* as shown in Fig. 3. Square from this cut face at both *A* and *B* to the back of the rafter as *C*. Connect these lines across the back and it will give the bevel for the bottom cut.



Obtaining Cuts of Gable Rafters

The drawing shows a rise of 15 to a run of 12 for the gable to fit a main roof with a rise of 8 to a run of 12. It should be self-explanatory and easily remembered.

Some Questions in Bungalow Construction

From E. H. B., Brooklyn, N. Y.—I have plans and specifications for a bungalow of frame construction but since receiving them I have changed my mind and decided to construct the building of brick. I want to make it 1 ft. longer and 1 ft. wider, outside measurement, the interior to be exactly the same as called for by the plans.

The present measurements of the building outside are, length 36 ft., width 24 ft., and I want the house to be 37 ft. long and 25 ft. wide.

What I wish to know is if this would interfere with the length of the joist and lumber already called for by the specifications. The only thing I can see different would be the extra length of the rafters—the house to have a gable roof—and the beams running through the center of the building.

If any of the readers of *The Building Age* can show me where I am making a mistake, if any, in connection with the plans, I shall appreciate it.

I might state that the hight of the basement is 7 ft. and the rooms are 9 ft. in the clear. Would a base or foundation 6 x 15 in. wide made of concrete with basement walls 12 in. thick, and from the ground floor to the roof 8 in. thick, be strong enough for a building of this kind, or would it be necessary to run a 12-in. wall to the roof?

Drying Lumber Samples by Electricity

From James F. Hobart, Indianapolis, Ind.—A few months ago a reader in Huron, S. D., asked for a method of drying wood samples by electricity, and as nothing has appeared in the Correspondence Department up to this time in reply thereto, I beg to offer a few comments which may prove of interest. The correspondent does not say anything about the quantity which he desires to dry, neither does he mention the size of sample and the lack of this information leaves things rather in the dark as to the equipment needed. If the samples are not more than 3 or 4 in. square and there is not more than a peck of them in quantity, the apparatus necessary will obviously be very different from that required if the samples are 3 or 4 ft. long and a wagon load of them.

There is only one way of drying wood and that is by passing enough air over it to carry away the moisture which may be contained therein. All that is therefore actually necessary for the purpose is a current of air and electricity may be used for driving a fan to compel the required circulation through the box containing the samples, be that box 6 in. square or 10 ft. long. A very effective little dryer may be constructed of wood, say a box 24 in. square, and as many deep. There should be an inlet and an outlet for the air and these may be made of common 5-in. or 6-in. stove pipe with dampers in each—close fitting dampers so that the air supply may be regulated at will or entirely cut off. The inlet pipe should be connected to some source of air supply. A common desk fan may be used for this purpose, the end of the pipe terminating in a funnel and the fan placed close to it.

In order to dry lumber quickly the air should be heated, as hot air has a greater capacity for moisture than cold air and by heating the air supplied to the dry box the moisture is taken up much faster than is possible by cold air. The heating may be done either in the dry box itself or outside in a chamber placed in the supply pipe. For one of the little dry boxes a glow-stove sold by dealers in electrical appliances will serve the purpose. The cost is about $5 and one may be connected to an ordinary incandescent lamp socket and will consume about 5 amperes at 110 volts. If a large dry box is to be used some car heaters may be procured and a current of 550 volts used. In case the stove or heater mentioned cannot be secured one may be built up by procuring some resistance wire and winding upon suitable supports a sufficient quantity of the wire to provide a resistance which will prevent more than 5 amperes of current from passing. With 110 volts, the current 5 amperes, the required resistance would be, where *I* equals the current

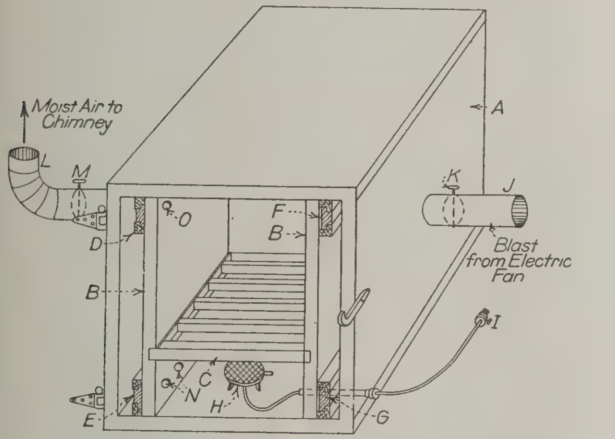
$$I = \frac{E}{R} \text{ or } 5 = \frac{110}{R}$$

and solving we find that

$$5R = 110 \text{ or that } R = 22 \text{ ohms}$$

the required resistance of the coil which has to do the heating. The size of the wire must be such that 5 amperes of current will heat it properly—red hot, and thereby heat the air which is driven over the coil by the fan.

Iron may be used for the heating coil but it will not last long. It is better to use Microme wire which is said to last for many months or even years without appreciable wear or oxidation. One, however, should not try to make a heating coil unless he is well up in electrical matters. If tried without a knowledge of such things there will be a strong likelihood of burning out a lot of fuses in the electrical plant and the entire thing may be put out of business.



Drying Lumber Samples by Electricity

Get one of the little glow-stoves, place it in the box and you can dry all the samples you can get into a box 24 x 24 x 24 in. or even larger.

In the accompanying illustration is shown a form of electric dryer which can be easily and economically constructed. Sheet iron or tin is preferable to wood and galvanized iron is better than anything else and should be used if the dry box is to be a permanent affair. The box shown in the perspective view has partitions placed vertically near either end as at *B-B* and a grating *C* is cut into the partitions for supporting the samples to be dried. Holes are bored through the top and bottom of each partition and may be opened or closed by means of the slides, *D*, *E*, *F*, *G*, so that the air may be sent through the box in various directions.

The little glow-stove, *H*, and the wires that connect with it lead through a porcelain tube set through the side of the box and the partition wires terminate in the plug, *I*, which may be attached to any convenient lamp socket. If desired the stove, *H*, may be placed outside of the box in an enlargement of the pipe, *J*, and the air heated before it is driven into the box. Either way will dry samples well, but the stove in the air pipe is a rather safer method in case of accident to the heating coil, since there is nothing combustible near the coil should it go bad or burn out, which seldom happens.

Let us not suppose that the box has been packed with samples. Turn on the heat and let the box and its contents warm up. It is well to do this before the fan is started. A tightly fitting door is, of course, supplied as indicated by the hinges and latch fastening in the illustration. It is well to face the door with felt to prevent loss of air and heat and make the box and partitions air tight before putting it into use.

After the box has become well warmed up, start the fan and send a gentle current of air through the box, say through the slide, *G*, and let the moist air escape through the slide and holes, *D* and *O*. The dampers and slides should be so adjustable that a slight current of air passes through the box. There should not be air enough admitted to prevent the coil from heating the amount of air, for it is of little use to send a current of cold air through the box. One might just as well omit the box and heater if this is to be done.

Watch the heater closely and so adjust the slides and dampers that the samples dry evenly. Sometimes it is necessary to draw out a little of the moisture laden air through the slide, *E*. Again, it may be best to admit hot air at *F* and take it out through the slide, *D*, as stated.

When a larger dry box is used the air circulation problem more nearly approaches that of a regular dry room and should be handled in a similar manner. The same principles found to work there will also work in the little dry box.

Difficulty in Making Satisfactory Blue Prints

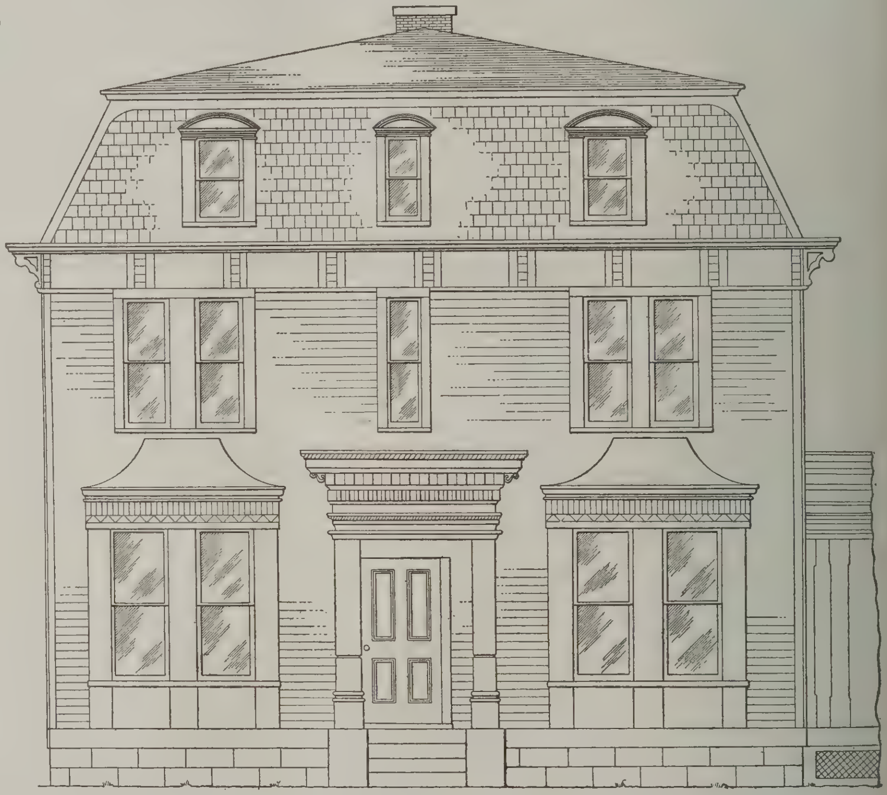
From Architect, Oak Park, Ill.—For the benefit of "R. E. B.," Clarksville, Tenn., I would say that I have had to make blueprints a number of times in places where no treated paper was obtainable and it was necessary to make the solution and coat the paper. There were no troubles encountered. Use 1 oz. citrate of iron and ammonia and 1 oz. red prussiate of potash. Dissolve in 8 oz. of cold water. These chemicals may be mixed separately and kept in close stoppered dark bottles and combined when needed but they are apt to deteriorate when in solution. It is best to keep the crystals in dark bottles in a dark place. The liquid should be filtered in order to take out undissolved pieces, the best filter being loose cotton. To dissolve the chemicals will take fully 10 minutes' time and the bottle should be shaken gently practically all of the time. This may be done in ordinary daylight but is best done by lamp light or in a room lighted with ruby or orange light. The mixture should be made in a bottle holding more than 12 oz., so there will be space for the shaking up of the 8 oz. of water.

Apply the mixture of paper in a dark room; that is a room lighted only by orange or red light and the light not strong. Apply the mixture to hard paper with a broad, soft, flat brush such as is used in letter-copying books. It may be applied by pouring in a shallow pan and floating the paper on the surface, guarding against air bubbles. Hang the paper in the dark room until dry. This will not take long as it should not be saturated. Only a thin coating is necessary. Partial exposure to light while preparing and washing the print does not affect it appreciably if the work is done rapidly. When first placed in the water put the printed side down and move the paper back and forth to help wash the freed material away. Then turn it over and move it back and forth. This is for convenience so the operation may be watched.

The best work is obtained by putting the print through a second bath of clean water after it has been washed as long as appears satisfactory. This cleans away the chemical solution left from the first bath. The writer, in order to reply to this question, has just completed a small blueprint, the solution being made with chemicals kept in glass stoppered bottles in a dark closet for the past five years. This probably answers the question regarding the effect of age on chemicals in crystal form. A solution would be good only a few days.

Front Elevation for "J. J.'s" Floor Plan

From D. P. Barry, Redford, N. Y.—In reply to "J. J.," New York City, whose inquiry appeared in a recent issue, I am sending a front elevation of a house which I think is about the only style suited to such a dwelling as he evidently has in mind. If he does not wish dormer windows he can easily omit them and if he wants a house one and a half stories in hight he may drop the mansard roof down to the first story. It will look well that way and he may make the top roof as steep as he likes. I put on one more than a quarter pitch and it looks imposing. As for the details he will suit himself. This style of building will stand a good deal of ginger bread work, cresting, etc., and another thing, one can use metal shingles on a mansard.



Front Elevation for "J. J.'s" Floor Plan

Mill Work and the Architects

From H. E. B. Beaumont, Texas.—Being a millman I desire to say that of all the trade papers I occasionally receive, few, if any, seldom mention the millman or his work. What the reason for this is I do not know, because I believe mill work is just as important as any other branch of the building crafts. Very often the architect, especially in residence or bungalow work, is too skimpy with his details. Sometimes his specifications are voluminous, whereas an extra sheet of details would serve the purpose ten times better, and the millman is left to guess at the proper construction of frames, casements, stairs or built-in furniture, as well as many other things for which the architect is getting paid and should explain or detail in some way. Very often the architect is not sufficiently familiar with practical work and really does not know how and perhaps could not erect a flight of stairs even to save his professional reputation.

I have tried several times to solicit subscriptions for trade papers, but never had any success, principally because there was nothing in the papers to interest the millman, while most of the other crafts were mentioned with some special article of interest to them.

Construction of a Clothes Dryer

From J. M. B., Monroeton, Pa.—I wish some of my brother chips would tell through the Correspondence Columns how to make a clothes dryer—one that is hung on a post at the center at the bottom and turns on the post. It has four or six arms to receive the clothes lines. I once saw one which had small sails which caused it to turn around with the wind.

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The new building code adopted by the City Council of Macon, Ga., and which went into effect September 1, provides that all buildings shall be roofed with non-inflammable material.

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It is said that the first sawmill in the United States was at Jamestown, from which sawed boards were exported in June, 1607. A water power sawmill was in use in 1625 near the present site of the city of Richmond, Va.

A Frame Dwelling in a Chicago Suburb

The Living Room with Its Open Fireplace Flanked with Book Cases One of the Striking Features

THOSE prospective home builders who incline to the idea of a broad porch or veranda extending entirely across the front of the house and who desire to include in the layout a living room of ample proportions cannot fail to be interested in the design which constitutes the basis of the present article. It will be seen from an inspection of the floor-plans upon the next page that the living room has at one end a brick fireplace and mantel flanked at either side by convenient book cases while over each of the latter is a window which affords light to that side of the apartment. Just how this arrangement appears in actual practice is pictured in the half-tone engraving on a succeeding page. There is also presented a glimpse of the dining room at the extreme left.

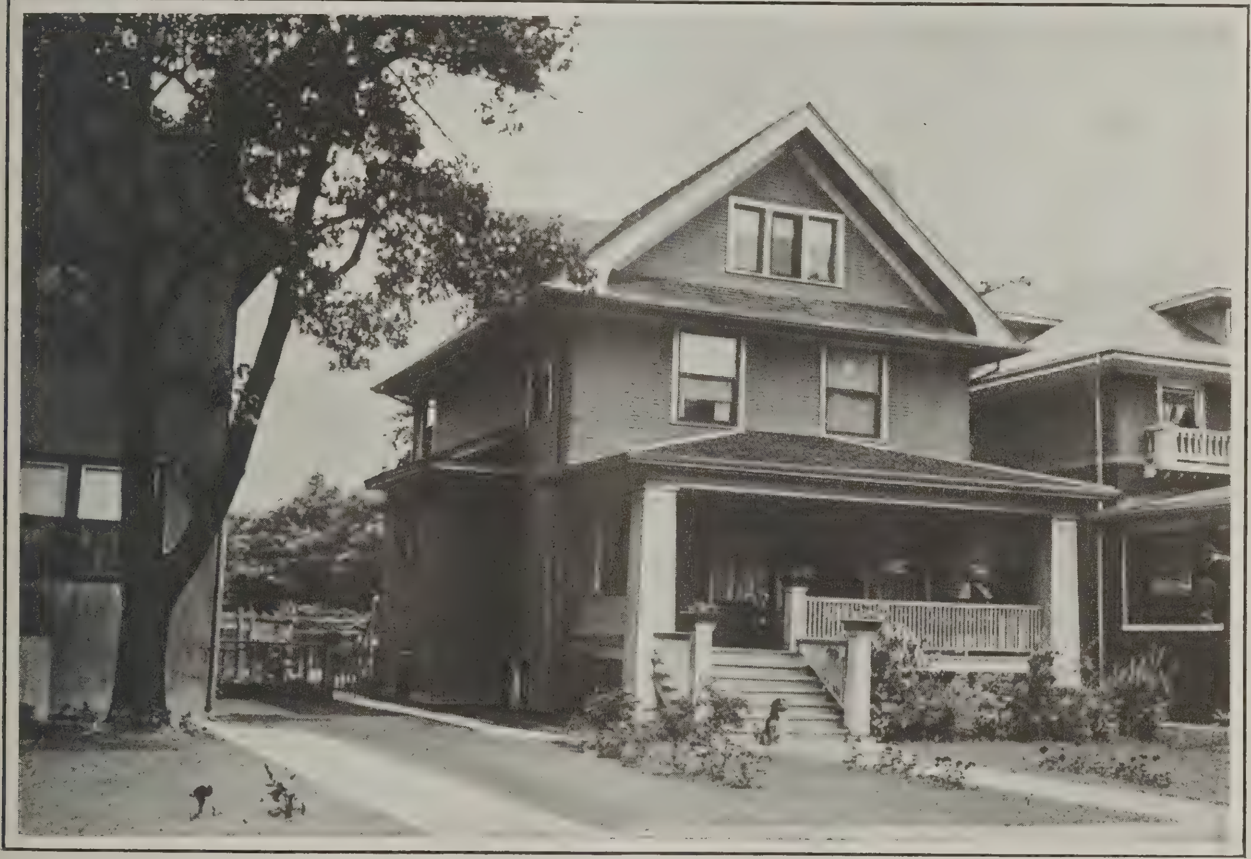
The main flight of stairs to the second story leads from a point in the living room directly forward from the front entrance. Use is made of a combination flight, the landing of which is amply lighted by the triple window in the extension clearly shown on the plan and also in the picture of the exterior view. Directly beneath the main flight are the stairs from the kitchen to the cellar.

Beyond the living room is the dining room with its bay-window which with the window directly at the rear affords ample illumination and renders this one of the cheerful rooms of the house. Communication with the kitchen is established through the medium of a commodious pantry equipped with shelving, cupboards, etc., and is lighted by a window at one end. The rear entry contains space for a refrigerator the position of the drain being clearly indicated on the plan.

On the second floor are four sleeping rooms each with a commodious closet. The bath room is centrally located and is readily accessible from any room on that floor. At the same time it is directly opposite the head of the main flight of stairs which land directly in the center of the house so that there is no waste hall space—a feature which is not always considered at the present day in the planning of this part of the home.

It will be seen from an examination of the plan that there is a rear balcony opening from one of the chambers and which may be utilized as a sleeping balcony if desired.

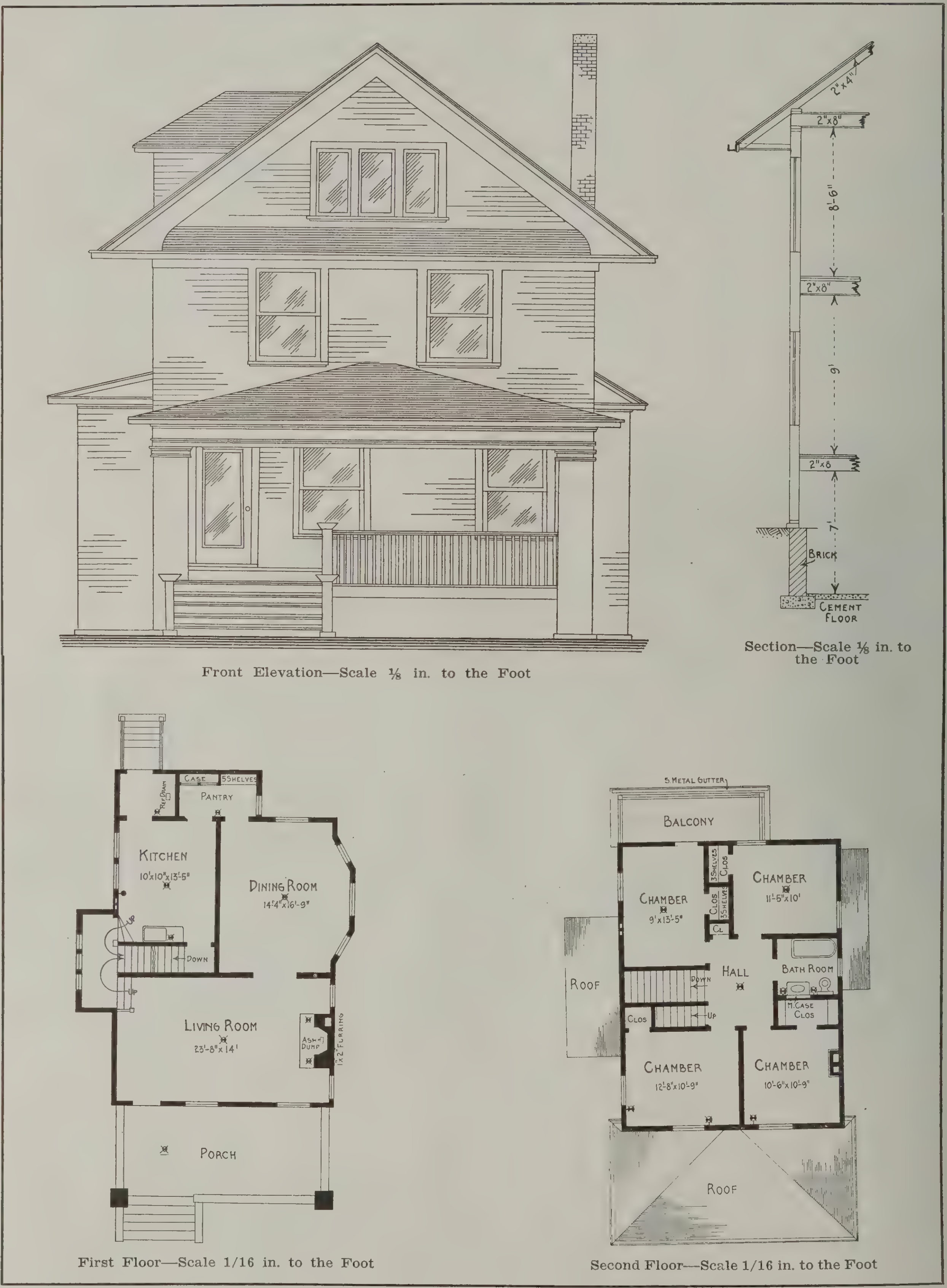
The two-story frame dwelling here shown was built in Rogers Park, Ill., by Webster H. Rapp, of that place.



Two-Story Frame Dwelling Erected in Rogers Park, Ill., by Webster H. Rapp

The Quantity System in Estimating

For some time past the subject of the quantity system in estimating has been receiving the attention of architects and building contractors and G. Alexander Wright, who may be said to have been the pioneer in promoting the movement in this country, has lately visited the leading cities addressing various bodies connected with the building and allied industries in advocacy of this system of preparing estimates. We present the following from his remarks before The Builders' Exchange of Baltimore:



Front Elevation—Scale 1/8 in. to the Foot

Section—Scale 1/8 in. to the Foot

First Floor—Scale 1/16 in. to the Foot

Second Floor—Scale 1/16 in. to the Foot

A Frame Dwelling in a Chicago Suburb—Plans, Elevation and Section

I was once in the employ of an architectural firm who had completed a building in San Francisco at a cost of about $700,000, with no less than 72 separate contracts. It was in connection with the closing of the work on this job that I went through the office files and found that 230 subcontractors had figured on the job, and had been put to this trouble without any result to themselves.

We need something to happen. This gambling system which we follow has become pernicious, so much so that we must try and get some better methods. The building contractor takes every risk, every chance, whether they be seen or unseen; whether they can be ascertained by him when he is figuring or not. When a man gets to work and starts figuring on a building has it not occurred to you that it is to compete against his brother members on the item of quantities?

When a list of bids is put before an owner he sees a difference of bids, and often is led to believe that it is a series of guesses, and often comes to the conclusion that he can guess as well as the fellow who is estimating. The owner usually guesses that the lowest bidder is the best. While, as a matter of fact, the architect, when receiving bids, is often morally certain that the lowest bidder cannot do a decent job in accordance with the plans and specifications, and sometimes he is told to take the plans back and go over his work. Yet he is often willing to take the chance. This is the source of a great deal of trouble. Often we find the lowest bidder has omitted something. It is not an uncommon thing to see a job figured over and over again. This means waste of time and energy. We are not in business for our health. When one man is getting the advantage of the other that is a system that is not conducive to good work. There are a great many angles at which you can look at this subject. There are bankers who are giving serious consideration to the very thing that we are discussing today. Surety companies are also looking up the question.

I want to assure you that the movement is receiving serious consideration from architects and general contractors. We find that the idea of having a quantity surveyor is becoming popular. The system that I propose is not an English system. We want to create an American system that will be just and suitable. There are a great many objections to the English system. Let us take whatever may be good and adopt a system of our own. It could be brought about by one set of men declining to give free bids and asserting this to the owner.

The new profession, the quantity surveyor, is coming. You have the nucleus of some of them in your town today. The idea is to have this man take an examination either before a local committee, men who may have the experience, or form an examining board. The whole stock in trade of the quantity surveyor lies in his honesty and accuracy, and as there is only one way that we can safeguard our interests it will be to have him work under the law for a certificate. If he should be found guilty of any wrongdoing it will be reported by the architect. If such a case should happen it is proposed to indorse his certificate in such a way that he could not practise any longer.

A Frame Dwelling in a Chicago Suburb—View in Living Room Looking Toward the Brick Fireplace and Mantel with Glimpse of the Dining Room to the Left

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The Italian Minister of Education will spend $15,440,000 for public school buildings during the four years 1913-1917.

A Two-Year Course in Architectural Construction

Those young men among our readers who are desirous of taking up the study of architectural construction, more especially those residing in the eastern section of the country, will be interested in learning that the Wentworth Institute, Boston, Mass., has added to its curriculum a two-year course in this branch. The new course will cover a very much needed field in the educational system and the preliminary enrollment indicates that the institute has again supplied a vital need in that community. Only those engaged in the building trades realize how modern fireproof, steel and cement construction is creating a demand for men especially trained in these branches, or how difficult it is to secure men with an intelligent understanding of principles involved and the practical application of these principles. This new type of construction is also affording excellent opportunities for advancement and leadership for young men who are properly trained.

We understand that the new course in architectural construction to be presented by Wentworth Institute will train this type of workmen, putting young men in a position to become foremen, superintendents and detail designers in all departments of the building industry or to hold positions of similar responsibility with architectural firms or with building contractors. While emphasis is placed upon practical construction in all of the more important building trades, enough instruction in theory and in design is included to enable the student to comprehend and appreciate the structural and artistic features of the work.

The instruction includes a thorough training in architectural drafting, study of Orders and of ornament, freehand sketching and architectural design in order that the student may work out the details of his buildings in perfect harmony with the spirit of the architect's designs. Sufficient instruction in mathematics and applied mechanics is included to enable the student to check up on the job all structural work and be sure that every portion of the building is properly proportioned to withstand the loads and strains for which it is designed. In addition such other departments of applied science as are important to the architect and the builder, including drainage and water supply, heating and ventilation, electricity, etc., are included.

In a catalogue of the Institute, just off the press, the statement is made that the fall term for the day classes extends from September 21 to December 18; the winter term from December 29 to March 19, and the spring term from March 29 to June 11.

For the evening classes the fall term extends from September 28 to December 18 and the winter term from December 30 to March 19. It may not be without interest to state that among the short courses provided by the Institute is a one-year course in carpentry and building, this furnishing in a shorter time and more practical way the training formerly offered by the old-time system of apprenticeship. In addition to the practical work in the shop the instruction includes mechanical and architectural drawing, plan reading, estimating quantities from plans and specifications, together with a thorough training in the scientific principles underlying the woodworking trades.

There is also a one-year day course in pattern making which is of the same grade and very similar in character to the course in carpentry and building, but intended more particularly for those who wish to specialize in the branch indicated.

Demolition of New York's Old Water Tank Building

There has recently been torn down at the northwest corner of Lafayette and Reade Streets, New York City, the four-story building which contained for more than a century the iron tank which supplied water to the lower part of the city before the installation of the Croton service. This iron tank was one of the landmarks of the city and in the early efforts to supply good water to the citizens it played an important part. Beneath the tank in the building was a large well, but it had not been used since 1842.

Sections of the wooden pipes which furnished water to many houses in the lower part of the city have frequently been dug up and during the excavations for the Hall of Records and the subway many of these old water pipes in a good state of preservation were unearthed.

Chattanooga's Unique Building

A structure which is said to be unique so far as that city is concerned is a nine-story reinforced concrete building going up on the outskirts of the business district of Chattanooga, Tenn. What is regarded there as the unique feature is the provision of bachelor apartments on the floors above the main story which is devoted to banking purposes. There are two-room suites with private baths and ten single rooms each with private bath. The ninth floor has a large sun parlor. The cost is placed at $100,000 and T. S. Moudy & Co., the contractors, Chattanooga, Tenn., are using the Kahn System in the work. The plans were prepared by R. H. Hunt also of Chattanooga, Tenn.

Competition in Fireplace Heater Design

The American Gas Institute and the National Commercial Gas Association have authorized a joint committee, of which William J. Serrill, 1401 Arch Street, Philadelphia, Pa., is chairman, to offer a prize of $150 for the best design of a fireplace heater, burning gas. The competition will close on the first of March, 1915, at which time the designs must be in the hands of the chairman of the joint committee. The award will be made by a committee on the recommendation of a jury composed of three members—an architect to be named by the American Institute of Architects, a member of the American Gas Institute and a member of the National Commercial Gas Association.

Construction of Concrete Septic Tanks

A Sewage Disposal System for Country and Suburban Houses—Size and Location of Tank—Materials Necessary

By Percy H. Wilson

THE well-managed farm of today means many household conveniences as well as labor-saving farm machinery. Back-breaking drudgery has been largely eliminated from both house and fields. Running water and the kitchen sink and bathroom have supplanted the old-time pump and open, insanitary drainage. But the most efficient disposal of sewage remained a problem until the concrete septic tank was invented. It is a simple, cheap and effective device, rapidly supplanting the drywell, with its constant menace of water pollution. In brief, there has come to the farmer his own little sewerage plant in concrete, which answers his purpose even better than large city works, for he has neither the tax nor repairs that attach to a city sewer system.

The principle upon which the concrete septic tank operates is extremely interesting. It consists of a long, water-tight cistern, through which sewage passes very slowly and evenly. Located underground, it is warm and dark, thus affording perfect conditions for the development of the bacteria or germs which clarify and render harmless the sewage. After passing through the septic tank, the sewage is practically free from all suspended matter and has the appearance of water. From the septic tank this clear effluent is discharged into three lines of ordinary farm drain tile.

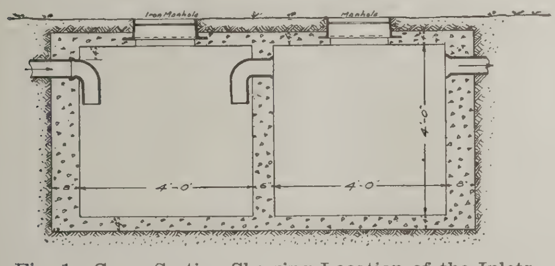

Fig. 1—Cross Section Showing Location of the Inlets and Outlets

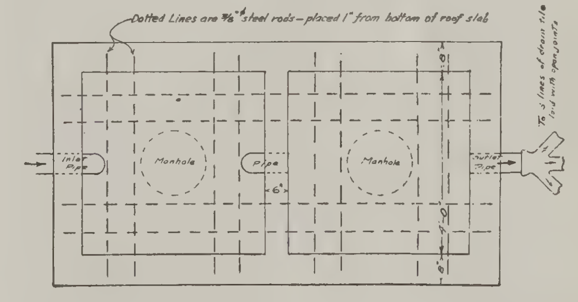
Dotted Lines are ⅜" steel rods—placed 1" from bottom of roof slab
8"
Inlet Pipe
Manhole
Pipe
6"
Manhole
Outlet Pipe
4'-0"
8"
To 3 lines of drain tile laid with open joints

Fig. 2—Plan Showing Proper Position of Reinforcing Rods

Construction of Concrete Septic Tanks—By Percy H. Wilson

Size and Location of Tank

While the odor from a septic tank is scarcely noticeable, it is nevertheless best to locate it at some distance from the house. Choose a spot easy to excavate so that the top of the tank can be sunk 6 inches below ground level and where the lines of drain tile will have sufficient fall to carry off the discharged fluid. The tank should be large enough to hold the entire sewage for one day. For a family of eight to ten people occupying a house having two bathrooms fitted with the customary appliances in the way of tubs and stationary washstands and downstairs the kitchen sink, a concrete tank having two compartments, each 4 feet long by 4 feet wide by 4 feet high, will be required. Since the top and bottom are each 4 inches thick and the top of the tank is 6 inches below ground level, dig the pit 5 feet 2 inches in depth. The walls of the tank are 8 inches thick and the partition between the two compartments 6 inches. Therefore, the length of the pit should be 9 feet 10 inches and the width 5 feet 4 inches.

Making Forms and Placing Concrete

If the earthen walls of the pit stand firm only inside forms will be needed. These inside forms are merely boxes made of 1-inch boards. Two boxes will be required to make two compartments. The outside dimensions of the boxes should be 4 feet square by 4 feet high. The boxes or forms will be placed on the freshly laid concrete floor. Holes for taking 6-inch pipe should be made in the boxes as shown in Fig. 1. The holes should be 4 inches from the top of the box form, measuring from the top of the hole. The concrete should be mixed in the proportion of 1 part Portland cement, 2 parts sand and 4 parts crushed rock or gravel. Place a 4-inch thickness of concrete in the bottom of the pit to form the floor of the tank. On top of this concrete set the box forms, which should be ready for immediate use. Place the forms so that there is a space of 6 inches between them and an 8-inch space between them and the earthen walls of the pit. Then commence depositing the concrete for the walls and partition. As soon as the level of the concrete reaches the holes in the forms place in the holes 6-inch pipes as illustrated. Then continue the concreting until even with the top of the forms.

Reinforced Top and Manholes

Two ordinary iron manhole frames and covers may be obtained from a local dealer in building supplies. The manhole covers should fit tightly and should not be perforated. The manhole frames should be 10 inches high so that when placed on top of the forms the upper edge will be even with ground level. If the manhole frame is of less height than this, it should rest on a circular piece of 1-inch board, which is nailed to the top of the form. Since the concrete roof is to be self-supporting, it will be necessary to reinforce it with a few lengths of ⅜-inch round steel rods. There will be needed 4 pieces of ⅜-inch rods, 9 feet 6 inches long, and 8 pieces 5 feet long. The roof is now ready to be placed. Place the manhole frames in proper position on top of the form, and deposit the concrete to a depth of 1 inch and on the concrete lay the long and short bars as shown in Fig. 2. When the bars are placed, deposit the balance of the concrete so as to bring the roof to a total thickness of 4 inches. As it will be covered with earth it is not necessary to give this top surface a smooth finish, merely level the surface by striking off with a straight piece of board. The tank should now be allowed to rest undisturbed for at least 2 weeks. At the expiration of this time, saw away wooden top of the forms inside of the manhole frames. Then enter the tank and remove the wooden forms, passing the lumber out of the manhole opening. While in the tank make certain that the pipes are all unobstructed and not even partially clogged with dirt or lumber. The inlet pipe is then connected to the pipe from the house and the outlet pipe joined to three lines of 3-inch concrete drain tile. The drain tile will be laid about 12 inches below the surface of the ground and the joints left open, that is to say, no mortar must be used in the joints. This permits the discharged fluids to be absorbed by the surrounding soil. The drain tile lines should be laid in the form of the letter "Y" and sufficiently extended to cover a large area of ground. Average conditions require that each arm be about 100 feet long. After this is done, cover the tank with earth to the level of the manhole covers. It is now ready for use.

It is sometimes the custom to plant a few shrubs around the manhole openings, thus effectually hiding all evidence of the tank.

Materials Necessary

A tank of the size specified will require about 4 cubic yards of crushed rock, 2 cubic yards of sand and 7 barrels of Portland cement. There will also be needed 78 feet of ⅜-inch round steel rods, which can be obtained from the local blacksmith or hardware dealer. The tank can be built without skilled labor. It requires few tools and construction methods are so simple that one man can build it.

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Hendricks' Commercial Register

The S. E. Hendricks Company, 2 West Thirteenth street, New York City, which is now the sole owner and publisher of Hendricks' Commercial Register of the United States, has just issued the twenty-third annual edition of this work. It is a cloth bound book of over 1700 pages, each measuring 10 x 7½ in. in size and constitutes a trade directory for buyers and sellers, being particularly serviceable for the architectural, electrical, engineering, mechanical, railroad, iron and steel and other kindred industries. The lists for buyers and purchasing agents are grouped under headings represented in the index by about 45,000 classifications and approximately 350,000 names and addresses.

As affording a slight indication of the scope of the directory and its value to those connected with the building business it may be stated that the list of architects occupies 30 pages; building and general contractors 30½ pages; lumber manufacturers and wholesale dealers 25 pages; brickmakers 18 pages; paint manufacturers 12 pages; masons and builders materials 14 pages; sash, door and blind manufacturers 8 pages; makers of cornices and skylights 8 pages; roofing and siding 6 pages; cement manufacturers 2½ pages; while several pages each are devoted to lists of makers of architectural and ornamental iron work; shingles of various kinds; sheet metal ceilings, steel structural work, concrete mixers, doors, door frames and fixtures, hardware manufacturers, makers of builders' hoists, manufacturers of interior finish, etc.

An outstanding feature of the Directory is the vast number of trade names and trade marks of goods given with the names of the manufacturers which more readily enables the inquirer to find a particular article otherwise often difficult to locate if of a type made by different manufacturers.

In the last edition matter formerly contained in the "Assistant Buyer"—a trade directory covering in considerable detail material relating particularly to hardware interests published by the Sullivan System, New York—has been incorporated in the text, the latter interest during the past year having been combined with the S. E. Hendricks Company. The price of the Directory is $10.

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Home Exposition in Chicago

The modern conveniences which are representative of home comfort, utility and economy were marshalled together in the Chicago Coliseum from September 16-26 on the occasion of the first annual Home Exposition. It was the aim of the promoters to bring before Chicago housewives the most up-to-date appliances for facilitating home conditions, and about 150 manufacturers maintained interesting booths.

One of the most attractive exhibits to be seen was that of the Morgan Sash & Door Co., Chicago, Ill. This company displayed about twenty different types of doors and a variety of finishes were to be seen. Representatives Fred J. Witt and George R. Lampton pointed out that "Morgan" doors are not only excellent in appearance, but that their thorough preparation assures the buyer of a guaranteed door, whether for interior or exterior decoration. It was also said that they are built along original lines, and that the name "Morgan" on the tops of all doors means perfection in construction, durability and lasting appearance.

The Chamberlin Metal Weather Strip Company, Detroit, Mich., showed a window fitted with strips which are guaranteed to prevent drafts, to keep the sash from rattling and to maintain a more even temperature in any room. Their efficiency is demonstrated in the statement made by Special Representative Shepherd Garretson that there are more than ten million users of Chamberlin strips throughout the country.

Sanitary garbage and ash boxes built of reinforced concrete were exhibited by Paul Persson, president of the Sanitary Garbage & Ash Box Company, Chicago, Ill. The types shown had an outside measurement of 24 x 24 in. base, and 42 in. high. Galvanized iron top covers are provided and sheet iron doors to the alley side for shoveling out. Ash sifters may be installed with these boxes for a small additional charge.

Air moistening devices for hanging on radiators or fitting into the registers of furnace heating installations were shown by President Burley of the Savo Manufacturing Company, Chicago, Ill. In each case the invention showed was a sheet metal receptacle in which water is poured. They are made in a variety of sizes to hang on the backs of radiators and hold from one gallon of water upwards. For installation in warm air registers the construction is such that the air passes through a sheet metal cone which is surrounded by water.

The Radke Manufacturing Company, of Chicago, Ill., showed its popular instantaneous hot water heater. In construction the heater is made safe to operate and its efficiency is guaranteed to be economical. Every Radke product is equipped with a thermostat to regulate the flow of gas to the burner, and also a thermo-safety valve, which closes automatically and shuts off all escaping gas in case the pilot light is accidentally extinguished. This feature makes it a safe installation for the home and is a protection against explosion or asphyxiation.

The Kerner Incinerator Company, Milwaukee, Wis., exhibited one of its chimney inventions for the sanitary disposal of all kinds of household refuse. The principle of this device is that of the brick smoke house in which meats are smoked to prevent them from decaying. An incinerating chamber with a capacity of ten bushels is built in the chimney, and a receiving hopper is provided in the kitchen. The smoke flue of the heater in the basement is slightly below the level of the incinerating chamber, so that lost heat, smoke, etc., will dispose of the garbage dropped through the hopper door. It is recommended as smokeless and odorless on account of the installation of a by-pass flue which insures perfect combustion at all times.

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Death of C. C. Taintor

It is our sad privilege to announce the death of Charles Chelsea Taintor, for more than 30 years intimately associated with this journal, which occurred after a brief illness on September 25th at his late residence, 584 Jefferson avenue, Elizabeth, N. J. He was born in Sandisfield, Berkshire County, Mass., June 25, 1838, and at a very early age his parents moved to Lee in that state. His early education was acquired at the Bradley Street School in that place, and as a young man learned the business of carpentry and building in Lee, where he resided for something like 20 years.

Striking out for himself, he went to Springfield, Ill., and for about 10 years was engaged in the business of building contracting. He erected some of the more important public buildings in that section of the country, as well as numerous dwellings, business blocks, etc. In 1871 he removed from Springfield to Elizabeth, N. J., where he engaged for a time in the building business, after which he associated himself with a Mr. Black in New York City, who was publishing the "Manufacturer and Builder," a journal devoted to building interests. After a short time, however, he, about 1878, entered the employ of David Williams, who was then publishing *The Iron Age* and the *Metal Worker*, and who, in January, 1879, put out the first issue of *Carpentry and Building*. The latter was continued by that name until 1910, when under the new proprietorship it was changed to *The Building Age*.

Mr. Taintor afforded much practical assistance in the early editorial conduct of *Carpentry and Building*, and up to about 1907 served as advertising solicitor for it as well as for the other publications of David Williams, continuing, however, in an editorial advisory capacity to *Carpentry and Building* until the fall of 1909. He was a prolific writer on practical phases of the builders work, his contributions to the correspondence columns of the paper in the early 80's, especially the letters appearing under the *nom de plume of* "Wood Butcher," attracting widespread attention among those in the trade, and the discussions created were of a most interesting and instructive nature. His comments on the use of the steel square in framing were particularly welcomed by carpenters at that time, as the methods described were such as to greatly facilitate the work of the builder. In fact, the principles which he ennunciated regarding the practical use of the steel square are the basis of most of the books at present on the market dealing with that subject.

Mr. Taintor was an inventor of a number of mechanics' tools, the best known of which perhaps are the Taintor Saw Set made by the Taintor Mfg. Company and a framing tool for carpenters and builders made by the Taintor Company. He was president of both companies from their inception and up to the time of his death.

Mr. Taintor was one of the founders of the Central Baptist Church of Elizabeth in September, 1877, and was a member of the first board of deacons. He was of genial temperament, a most entertaining conversationalist and always had ready some humorous story to illustrate his point. He enjoyed a very extensive acquaintance in the business world and was held in the highest regard and esteem by all those with whom he had dealings.

He leaves a widow, a daughter and a son, Archie R. Taintor, who for some time past has been associated with his late father's business interests.

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George A. Gindele, a Chicago pioneer builder and contractor, died at his home at 6710 Normal avenue, October 10, aged 70 years. He was identified with the construction of the Auditorium Hotel, the old Chicago Tribune Building, the Unity and Security Buildings, the Yerkes Observatory at Lake Geneva, the Newberry Library and the drainage canal. He was born in Batavia, Ill., June 11, 1844, and went to Chicago in 1852. In later years he became connected with his father in the contracting firm of J. G. Gindele & Sons, and later of the firm of Angus & Gindele, building contractors.

Hints on Laying Hardwood Flooring

Two Classes of Hardwood Floor Layers—Not Necessary That Every One Should Be an Expert

By W. L. Claffey

THE hardwood floor as a rule is laid by a professional commonly known as a "floor layer," who specializes in the laying of hardwood floors, such as oak, maple and beech flooring. These floor layers may be divided into two classes—the good and the bad. The expert floor layer obtains his reputation by the high class and perfect work that he turns out. It is practically his only asset in the game. Many large floor laying concerns reach their prosperous condition chiefly through conscientious workmanship in their earlier career. The floor layer who is careless or ignorant will never succeed.

The Man Who Understands His Business

The floor layer who makes good is invariably the one who knows the proper method of laying floors. A good floor layer does not rely upon the contractor for all his business, as in fact the greater share of his work is obtained through satisfied owners.

One expert floor layer I know, makes a specialty of canvassing among very fine old homes that were erected during the days when only soft pine floors were to be had. Usually ⅜ in. thick oak flooring is used for old homes, laid directly over the old pine floors. This expert in a very few minutes, after ascertaining the square feet of space to be recovered, will tell the cost, including the finishing.

Some Cases of Improper Work

While on this subject, it may be well to mention some actual cases that the writer was called upon to investigate, which are quite pertinent. In Detroit about a year ago, 2450 feet of oak flooring was laid parallel with the sub floor by an incompetent man. The sub floor in the course of ten days began to contract, with the result that it made crevices in the floor above every six inches, which was the exact width of the sub floor material. The owner complained to the dealer, and I was called upon to look into the case. A glance at the floor immediately told me that the flooring was laid parallel to the sub floor, which I proved by going into the cellar and noting the direction the sub flooring ran. The floor layer was called upon to explain why he laid the oak flooring over the sub floor in this fashion. He had no good excuse to offer other than he thought it was the proper way. It brought out the fact that he was a novice at the work. Every bit of this oak flooring had to be taken up and replaced by new material which was laid at right angles to the sub floor.

Another case in Kansas City showed 2000 ft. of oak flooring laid in a very fine residence immediately after being delivered. At the retail yard it was given improper housing, and it absorbed considerable moisture, resulting in many pieces swelling to the extent of 1/16 in. from the original manufacture. The period was during the winter season. The result was that unsightly crevices appeared after the house was heated. The architect in this case placed the blame on the retailer and the floor layer. He contended that during the winter season hardwood flooring, especially oak, should be kept in a very dry and warm place for at least ten days or two weeks prior to the time of laying. This floor also had to be ripped up and replaced by new stock at a big expense, which was borne by the dealer and the floor layer.

At Ithaca, N. Y., a few years ago, an 8-in. brick wall was bulged out to the extent of 3 in., and after investigation it was found it was due to the flooring, which was oak, being badly abused by too much water being left on while scrubbing the floor, which caused the swelling. Usually in a case of this kind the floor will bulge in the middle of the room, but it was found in this particular case that nails were generously used through to the oak sub floor.

In another case in St. Louis, where crevices showed throughout the floor the sub floor was green stock and the carpenters left no space for contraction. A few months after the flooring was laid the boards contracted from ¼ in. to ⅜ in., and as the flooring was laid diagonally, it made bad crevices.

Floor Layer Must Use Good Judgment

A first-class hardwood flooring job does not only mean the proper laying process, the right kind of nails, scraping, etc., but it means that the floor layer should exercise some judgment in keeping discolored pieces and other bad appearing pieces from prominent places in the room. Very often when entering a room you see a bad looking piece that is not covered by the rug, which should have been placed in some obscure corner or closet. The most successful floor layers employ an assistant to pick out bad-looking strips and see that they are not laid in prominent places. A floor layer should have a thorough knowledge of the different kinds of hardwood flooring before entering into this field.

In oak flooring there are five grades—clear, sap clear, select, No. 1 common and factory. Each grade has its uses.

It is not necessary that every floor layer be an expert. Any ordinary carpenter with good common sense, after reading booklets as published by the manufacturers of hardwood flooring, can enter upon this line of work and make a success of it.

Plans have been filed in Newark, N. J., for a store building estimated to cost $400,000. It will be 160 ft. wide and 139 ft. deep and will constitute an addition to the present structure of L. S. Plaut & Co.

New Publications

Progressive Furnace Heating.—By Alfred G. King; 280 pages. Size 6¼ x 9¼ in.; 189 illustrations. Bound in board covers. Published by the David Williams Company, 239 West 39th Street, New York City. Price $2.50.

This work has been compiled as an aid to the installation of good furnace heating systems and will therefore be found of special interest to the heating contractor as well as to the architect and the builder who desires to keep posted on the best practice in this line. It is probable that few of those at present engaged in the installation of the warm air furnace realize the possibilities of heating by this means. The subject matter is considered in two parts, the first of which by Mr. King is devoted to the design of furnace heating systems. He takes up in detail the important items in furnace installation, opening with a chapter on chimneys and the proper connection with them in order to insure satisfactory operation. He then comments upon the selection of a furnace for the fuel which is to be used and the building in which it is to be installed. This is followed by explanations regarding the size and arrangement of pipes and registers. Plans are given so that the application of the methods described may readily be understood by the practical man. Ventilation, the use of fans, the re-circulation of the air, the use of water heaters and radiators, temperature regulation, cement construction for furnace men, fuel and combustion are all explained in a simple and comprehensive manner.

The above is supplemented by a complete treatise on the construction and patterns of furnace fittings by William Neubecker, a well-known sheet metal expert in New York City. This chapter considers the various methods for developing and constructing the many styles of furnace fittings as well as the rule to be followed for finding the true angles of elbows from given dimensions.

The work concludes with a series of tables, rules and useful information of value to the furnaceman and the sheet metal worker.

Vitruvius: The Ten Books on Architecture.—Translated by Morris H. Morgan, Ph. D., LL.D.; 319 pages; profusely illustrated. Bound in library buckram. Published by the Harvard University Press. Price $3.50 net.

Probably no treatise ever written has exercised a greater influence upon architectural history than the treatise of Vitruvius known as *De Architectura.* The author was probably a contemporary of Augustus; at any rate he was more than a builder and engineer. Incidentally he gives many glimpses of the life and daily thought of his times as it affected the architecture, and his evident study of Greek philosophy and science contribute to make his work the most important literary medium through which the principles of ancient classical architecture have been transmitted to modern times. With the exception of one treatise on sewers, he furnishes the only contemporary description of Roman methods of building and from the early Renaissance until a recent date the architecture of almost all European countries has owed much to this treatise. It therefore forms a commentary not only on actual ancient methods but on the aim and inspiration that guided the modern classical revival.

The translation is the work to which the late Morris H Morgan, Professor of Classical Philology in Harvard University, devoted the last years of his life. It seeks not only to furnish an exact English translation but to render something of the personality of style in its author. Professor Albert Andrew Howard of Harvard University has finished the translation and supervised the editing of the text. More than 60 illustrations have been prepared by Professor Herbert Langford Warren, also of Harvard University, including measured plans and elevations of actual and "typical" works of Vitruvius and of Greek and Roman monuments such as have come down to us, reproductions of wood cuts in Fra Giacondo's edition of 1511, and numerous photographs of existing Romans remains.

Chicago Cement Show

It is stated that at the drawing for locations on August 8 four-fifths of the floor space available at the Cement Show to be held in Chicago, February 10 to 17 inclusive, 1915, was assigned to over 100 manufacturers. Never before has there been such a large reservation of space so far in advance of the opening of the Show. We understand that many prominent manufacturers who have not participated in the Show for several years past have decided to take space for next February. Important associations which have already fixed their dates during the Cement Show in Chicago are the National Builders Supply Association and the Illinois Lumber and Supply Dealers Association. Wide interest is apparent and there is every indication of a most successful exhibition.

Concrete Houses for Workingmen

A short time ago we referred to the fact that a number of small houses were being constructed of concrete at Midland, Pa., for the employees of the Pittsburgh Crucible Steel Company. It is interesting to note that these houses are 17 x 30 ft. in plan and are arranged with four rooms and basement. The living room is 15 x 16½ ft. in size and from it rises a 3-ft. stairway leading to the second floor. The kitchen is directly back of the living room and of the same size. The two rooms on the second floor are of the same size as those below.

The floors are of a 1:2:4 mixture of concrete with a double reinforcement consisting of ½-in. round rods spaced 9 in. each way.

The walls of the houses are reinforced with rods of the same size spaced 18 in. both ways. It is stated that the cost of materials and the "pouring" of each house did not exceed $750.

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The Doremus Memorial Gymnasium which is about being erected at Washington and Lee University, Lexington, Va., will be two full stories in hight, of Colonial design and constructed of red brick. The main exercise hall will be 65 x 130 ft. in plan balanced by two wings each 40 x 80 ft.

Brief Review of Building Situation

Figures Showing Building Activities in Leading Centers of the Country in September, 1914, and September, 1913

THE difficulty of obtaining funds for important building operations, together with a desire to pursue a conservative course until the general situation assumes a more normal aspect, is somewhat sharply reflected in the reports which reach us for September from nearly 100 cities of the country. There are some sections where building activity has been upon a scale somewhat in excess of that for the corresponding period last year, but in the majority of instances the figures show a heavy falling off in the amount of new work that is being projected. In fact, of the cities reporting, only 24 show an increase in building operations, while 73 show a decrease, the aggregate result being a decline for the country of 23.7 per cent. as contrasted with September, 1913.

For convenience of comparison we have divided the country geographically into four zones and find that the cities in the Eastern States make by far the best showing, the decline as compared with September last being only 9.1 per cent. From the accompanying table it will be seen that the more notable increases include Bridgeport and New Haven, Conn.; Harrisburg, Pa.; the Boroughs of Brooklyn and the Bronx in Greater New York; Paterson, N. J., and Scranton, Pa. Important decreases include Albany, Hartford, Philadelphia, Rochester, Syracuse, Worcester, Mass., and Yonkers.

CITIES IN THE EASTERN STATES

	1914		1913	
Albany, N. Y.	291	$267,325	1,262	$4,995,375
Altoona, Pa.	57	62,351	74	74,551
Bayonne, N. J.	17	152,766	22	46,950
Bridgeport	95	314,890	79	224,323
Brockton, Mass.	39	57,514	50	63,245
Buffalo	316	761,000	326	821,000
East Orange, N. J.	...	91,334	...	258,345
Elizabeth, N. J.	27	72,309	52	182,000
Erie, Pa.	122	238,240	161	288,956
Harrisburg	...	105,450	...	83,800
Hartford	...	129,910	...	369,421
Haverhill, Mass.	...	43,600	...	92,600
Jersey City, N. J.	100	193,822	102	244,872
Lawrence, Mass.	15	58,250	15	64,025
Manchester, N. H.	72	77,037	99	161,015
Newark	154	231,660	208	561,526
New Bedford, Mass.	80	462,225	126	510,742
New Haven	74	431,610	94	243,880
New York:				
Manhattan	295	5,475,220	425	6,397,128
Bronx	231	1,239,801	391	621,096
Brooklyn	714	3,522,290	801	2,405,750
Queens	...	1,272,047	...	1,918,928
Passaic	21	20,860	38	51,970
Paterson	77	72,783	49	54,215
Philadelphia, Pa.	1,208	1,811,305	1,302	4,363,955
Pittsburg	293	880,649	238	1,434,790
Portland, Me.	22	25,020	32	179,000
Reading	42	47,150	27	69,025
Rochester	258	666,554	279	843,226
Scranton	71	313,218	53	71,420
Springfield, Mass.	123	255,016	108	232,025
Syracuse	169	262,325	441	1,442,703
Troy	69	71,104	301	1,253,950
Wilkes-Barre	118	84,030	53	133,053
Worcester	116	262,260	142	404,619
Yonkers	25	101,500	111	993,000

Coming to the cities of the Middle States we find 8 showing a gain as compared with last year and 22 a loss, with a total decline of 16.2 per cent. Here the most notable changes occur in Chicago, Milwaukee, St. Paul, Detroit, Cleveland, Minneapolis and Grand Rapids.

CITIES IN THE MIDDLE STATES

	1914		1913	
Akron	133	$286,375	226	$393,645
Cedar Rapids, Iowa	42	264,000	43	258,000
Chicago, Ill.	709	4,925,900	930	7,858,920
Cincinnati, O.	1,200	665,608	993	868,576
Cleveland	1,078	2,132,870	1,065	1,949,545
Columbus	199	491,725	237	473,195
Davenport	53	108,957	33	79,250
Dayton	55	42,785	102	107,955
Des Moines	...	380,650	...	127,750
Detroit	558	1,547,235	856	2,056,855
Duluth	...	187,829	...	473,897
East St. Louis, Ill.	41	74,515	62	124,673
Evansville	...	89,145	...	101,710

CITIES IN THE MIDDLE STATES (Continued)

	1914		1913	
Fort Wayne	53	122,860	89	278,355
Grand Rapids	150	427,624	150	1,573,350
Indianapolis	466	411,628	551	675,504
Kansas City	238	565,035	309	676,695
Lincoln, Neb.	37	93,650	44	101,650
Milwaukee	379	1,162,004	333	874,509
Minneapolis	481	881,275	608	1,449,650
Omaha, Neb.	74	312,360	97	414,580
Peoria	47,	136,750	47	142,245
St. Joseph, Mo.	65	26,172	55	77,120
St. Louis	753	651,489	785	1,180,809
St. Paul	157	2,811,936	211	910,908
Sioux City	38	84,050	59	100,085
South Bend	36	42,100	41	60,028
Springfield, Ill.	42	139,230	28	52,385
Toledo	203	360,358	222	672,489
Topeka	37	40,610	41	116,005

In the Southern States there is a loss of 37.5 per cent. as compared with September last year, 5 cities reporting a gain and 12 cities a loss. Increased activity is to be noted in Chattanooga, Nashville, Richmond and Tampa, Fla.

CITIES IN THE SOUTHERN STATES

	1914		1913	
Atlanta	245	$170,804	309	$384,723
Baltimore	789	653,743	377	808,237
Beaumont, Tex.	...	43,323	...	27,899
Birmingham	...	162,315	...	242,099
Charlotte, N. C.	14	28,000	26	292,937
Chattanooga	217	77,387	187	50,120
Dallas	74	140,269	165	469,925
Louisville, Ky.	...	267,370	...	297,170
Memphis	163	132,160	273	288,355
Nashville	56	77,505	39	49,390
New Orleans	...	159,277	...	186,769
Richmond	130	136,799	110	122,361
Savannah	48	99,360	63	184,985
Shreveport	...	58,077	...	74,573
Tampa, Fla.	128	80,550	126	53,055
Waco, Tex.	...	17,245	...	40,320
Washington, D. C.	...	390,511	359	740,886

Taking some of the leading cities west of Salt Lake there are two which show an increase as compared with last year and 12 a decrease, with a loss for the section of 40.8 per cent. The two cities showing an increased amount of building as contrasted with a year ago are Denver and Salt Lake City. The important decreases are found in San Francisco; Portland, Ore.; Spokane and Tacoma, Wash., and San Diego, Cal.

CITIES IN THE WESTERN STATES

	1914		1913	
Berkeley, Cal.	71	$94,500	87	$144,000
Colorado Springs	31	28,935	38	38,405
Denver	...	1,007,130	...	295,490
Los Angeles	779	1,106,064	1,387	1,748,665
Oakland	334	354,562	354	456,424
Pasadena	158	134,954	170	140,803
Portland, Ore.	445	309,140	667	1,621,005
Salt Lake City	...	481,850	...	142,937
San Diego	177	131,541	264	352,660
San Francisco	524	830,081	386	2,273,723
San Jose	53	27,148	36	37,373
Seattle	820	556,560	939	692,885
Spokane	66	42,265	79	678,715
Tacoma	133	86,826	194	157,848

For the nine months of the current year the figures are much more favorable and the activity prevailing in building circles amounts to practically the same as that for the first nine months of 1913, the difference being only 4 per cent. in favor of last year.

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Annual Convention of National Association of Builders' Exchanges

It has been decided that the next annual convention of the National Association of Builders' Exchanges will be held in the city of Columbus, Ohio, on January 26 to 28, inclusive, 1915.

Current News of Builders' Exchanges

Brief Accounts of the Pleasant Annual "Outings" of the Members of Various Exchanges

Fall "Outing" of the Cleveland Exchange

More than two hundred men connected with the building industry of Cleveland attended the annual fall outing of The Builders' Exchange of that city held on the afternoon of September 16th. The members assembled at the Exchange rooms in the Chamber of Commerce building and were given badges on which were printed the name of the member and the firm represented by him, these badges serving as a means of extending acquaintance. The party left the city at 1:30 o'clock in automobiles, the members having cars being hosts to those who were not the possessors of such means of transportation. A long line of automobiles proceeded through the westerly section of the city, passing Edgewater Park and the boulevards, along

Group Picture of the Members of The Builders' Exchange, Cleveland, on Their Annual Fall "Outing" the lake shore out into the country to Dover Inn, located in Dover township west of the city in very attractive rustic surroundings. The party was greeted by Chairman Thompson, who had preceded the excursionists and engaged the Rocky River Silver Cornet Band to make a noise when the party arrived. The grounds about the Inn were decorated with American flags and ideal weather conditions contributed in making the outing unusually pleasant.

Arriving at the Inn, the crowd soon became busy with baseball games and other forms of amusement. Several teams were organized and few spectators were left to witness the many ringed circus conducted in a green field near the Inn with players good, bad and indifferent. The principal game was played between contractors, whose team was managed by President Rutherford of the Exchange, and material dealers, whose team was managed by W. A. Fay, a director of the Exchange. So intense was the rivalry that several umpires were necessary to conduct the affair and both sides claimed a victory when the smoke of battle had cleared away.

A tug-of-war between the "Germans" and the "Allies" afforded considerable entertainment. The Allies worked a strategy by fastening their end of the rope to a large apple tree which the Germans did not succeed in up-rooting although they pulled long and hard to accomplish their purpose.

At 5:30 o'clock a dinner was served, consisting of several courses, comprising the delicacies of the season. After the dinner, the members visited for a time on the lawn, singing songs, telling stories and making merry in general. The return was made to the city in automobiles with everybody happy over the success of the afternoon vacation.

Outing of the Builders' Club of Minneapolis

The members of The Builders' Club, which in a way represents the inner circle of The Builders' Exchange of Minneapolis, enjoyed their annual outing this year at Turtle Lake, located 10 miles north of St. Paul, and which is reached only by automobile. There was a procession of cars under the guidance of President Ralph and Secretary Eugene Young, who occupied the Pathfinder. Evidently all of the cars did not keep up with the leader, as several drivers were understood to have lost their way, but all are said to have enjoyed the trip. There were bathing, a baseball game, water polo, and other sports, and as luncheon was taken along by the party in baskets there was also the element of the picnic in connection with the affair.

The Rochester Builders' and Traders' Exchange

The members of the Builders' and Traders' Exchange of Rochester, N. Y., held their tenth annual outing at Cobourg, the number participating being 385. A band and an orchestra were taken along and there was an all-day luncheon served by 18 waiters so that no one went hungry. The outing was one of the most enjoyable in the history of the Exchange and it will linger long in the memories of those who participated.

Much of the success of the occasion was due to the enterprising and energetic secretary, G. Henry Fisk, and to the Committee of Arrangements, consisting of William M. Friederich, George L. Swan, Charles W. Luther and Charles S. Rauber.

Doings of the Birmingham Exchange

We have received from Secretary G. T. Stafford of The Builders' Exchange of Birmingham, Ala., a copy of the "Builders' and Buyers' Guide" which has just been issued containing a classified directory of the membership of that organization. Not only are the names and addresses of the members given but their telephone numbers as well, the names being arranged in alphabetical order. The directory makes a pamphlet of 40 pages, and carries on pages facing the names of the members advertising matter of special interest to those engaged in the building business. The statement is made that the Builders' Exchange of Birmingham is the recognized medium of organization for contractors, sub-contractors and material dealers as well as of others connected with the building industry of that city. It appeals to the builders whether their business is large or small, first, as a firmly established public spirited institution devoted to the best interests of the builders as a body and to the community as a whole, and second, because of the unusual opportunities it affords to members in a business and social way.

One of the most enjoyable occasions in the recent history of the organization was when 600 members of the Builders' Exchange of Birmingham, Ala., held their annual outing and barbecue at the Clubhouse of the Birmingham Motor and Country Club at Edgewood. Each member was provided with a tag which he wore on that occasion, for it was necessary to show it in order to gain admission to the Clubhouse. As pertinent to the occasion the following lines were composed by the poet of the Exchange:

Come, builders all, of every kind,
  To Edgewood Country Club;
Throw off your cares, be boys again,
  One happy brotherhood.
On Thursday, August Twentieth,
  From twelve o'clock till five,
We'll feast and joke and play the game
  Till you're glad you are alive.

Jim Payne is generalissimo,
  He supervises all.
The chief of transportation
  Is Wittichen, our Carl;
And Sibley, king of mixers,
  Assisted by McLeod,
With coffee hot and buttermilk
  Will win your praises loud.

And Hunt, of *chefs* the premier,
  With lamb and veal and shoat
All roasted, seasoned, ready—
  Better take off your coat
And get right down to business,
  Enjoy the feast supplied;
For Ingalls has his inning
  When the inner man's satisfied.

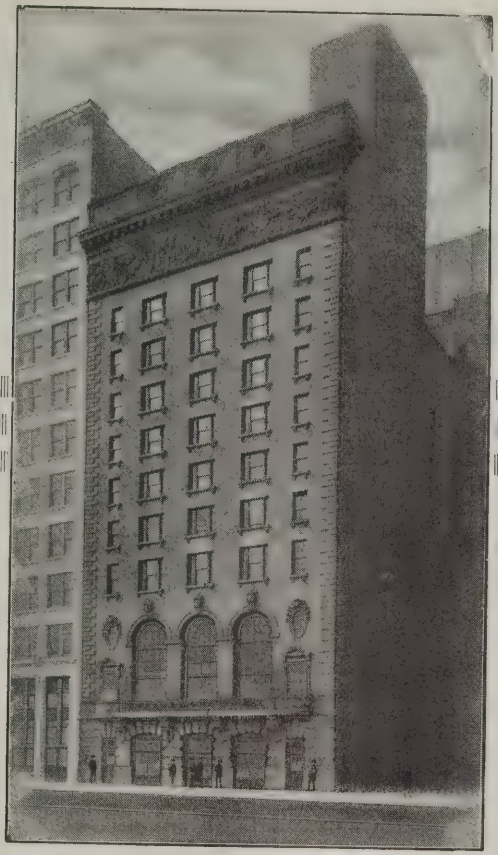
Lean men, fat men, short men, tall men,
  Runts or giants, any and all men,
Join the sports and win your prizes
  Watch out for a few surprises;
For it's always fair weather
  When the builders get together;
With wit and fun and merriment
  We'll have the barbecue.

A most appetizing menu had been prepared for the occasion and full justice was done it prior to the carrying out of the athletic program in the afternoon. Unfortunately rain interfered to some extent with the sporting events, but did not dampen the enthusiasm of the members. Every one had a good time and the hospitality of the Exchange was greatly enjoyed.

Effect of War on English Building Industry

Advices from English sources are to the effect that the influence of the war on its industries is beginning to show itself in the official returns relating to unemployment. In some cases a seasonable decline had already begun before the war broke out so that all of the idleness was not due to that cause. In many trades and very largely in the building industry short time had been resorted to in order to avoid laying off workmen. The figures of unemployment among members of the insured trades show that the percentage of idle among carpenters at the end of August was 5½ per cent.; bricklayers, 5.7 per cent.; masons, 3.8 per cent.; plasterers, 7.3 per cent.; painters, 9.7 per cent.; plumbers, 4.9 per cent., and laborers, 6.2 per cent. Taking all the occupations together the percentage of idle was 6.2 per cent.

Those patrons of *The Building Age* who are interested in building up an export trade in their products will be glad to learn that I. F. Webner, 9 Fish Lane, Cape Town, South Africa, is desirous of getting in touch with American manufacturers wishing to do business in that country and who are not already represented there.



A Thorough Test Before the Burt Was Installed on this Chicago Club Building

When the Illinois Athletic Club started to build their home in Chicago they set out to make it the finest athletic building in the Middle West from cellar to roof. The most prominent features on the roof are Burt Ventilators—so we know that the ambition of the builders was gratified at the top of the building in any case. We trust that they succeeded as well in all other parts of the building.

Burt Ventilators score their greatest triumphs in competitive tests—when the purchasing agents of American corporations, great and small, test every ventilator the market affords.

There's a place for you as a Burt representative—are you going to fill it?

The Burt Manufacturing Co.
312 Main St., Akron, Ohio, U. S. A.

Geo. W. Reed & Co., Montreal, Sole Manufacturers of Burt Ventilators for Canada

Now is the Time To Order Storm Sash

Prepare for Winter Early!!

Sash 72c Up—Doors $1.43 Up

Also 5000 Bargains Shipped Anywhere!

Jap-a-Top Roofing

Beautiful—Durable. Surfaced with genuine Slate. 2 colors—Red and Grayish Green.
$2.25 Per Roll of 108 Square Feet

Price per sq. of
Jap-a-Top Shingles
424 Shingles $4.75

Also Other Quality Roofing
as low per roll of 108 square feet, 90c.

Windows and Glass

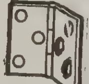
Check Rail Windows, 74c up. Plain rail, glazed, 66c up. Transoms, 40c each. 8 x 10 window glass, 3½c per light. Any size at equally low prices. Safe Delivery Guaranteed. Dealers charge 5 to 10 times our prices.

BUILDING MATERIAL CATALOG
GORDON VAN TINE CO DAVENPORT-IOWA

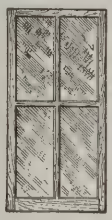
No one else can give you Quick Action—Quality and Prices Such as Gordon-Van Tine offer you under Guarantee of Satisfaction—or Money Back.

Storm Window attached with peerless hanger and equipped with Sash Fastener. Open.

Everything In Builder's Hardware



Everything in Builder's Hardware direct to you at wholesale—hinges, locks, door sets, window sets, etc., 3½ x 3½ inches, **14c** per pair.



Storm Sash and Storm Doors

Make snug for winter NOW. All sizes. All styles. Also builder's hardware, hinges, knobs, locks, catches, buttons, etc. "A" Quality and Painted.

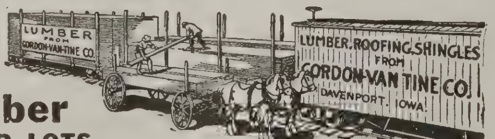
All White Pine STORM SASH as low as 72c. STORM DOORS as low as $1.43.

Wallboard Bargains

Wallboard is the Great Modern Substitute for Lath and Plaster. Also fine for partitions to finish off rooms, attics, etc. Comes in sheets ready for use. Goes on dry. Cold-proof, vermin-proof, handsome, durable. **Beats Plaster. Costs Less.** Wallboard costs 50 per cent less to lay. Lasts as long as the building.

Quality Wallboard
1000 Square Feet, $22

See Special Wallboard offers in Grand FREE CATALOG.

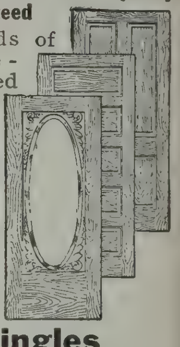

LUMBER FROM GORDON-VAN-TINE CO.
LUMBER, ROOFING, SHINGLES FROM GORDON-VAN TINE CO. DAVENPORT, IOWA

Lumber
IN CAR LOTS

SAVE $100 TO $300! Our Special Latest Lumber List and FREE Catalog offer choice to you of Millions of feet of clear, dry, clean, seasoned lumber at Wholesale Prices. Dimension, heavy Joists and Timbers, Drop Siding, Beveled Siding, Ceiling, Partition, Wainscoting, Finishing Lumber, Laths, Shingles, Boards, Posts, Poles, Battens, etc. All lumber graded in accordance with rules of the Lumbermen's Association. All Millwork of High Quality Standards, established by the Northwestern Sash, Door and Blind Mfrs. Assn. Every stick guaranteed up to standard quality. Estimates furnished FREE on guaranteed costs to you. BARGAINS in Moulding and Finish. Many special designs. All latest new stock. See Big Reductions in 1914-1915 Grand Free Millwork Catalog, just out.

Doors as Low as 77c

All Styles aud Sizes—Quality Guaranteed



Hundreds of special designs, glazed and unglazed. Oak, White and Yellow Pine, Cypress, Fir, Oak Veneer, Solid Yellow Pine and Front Doors.

Shingles

Extra "Star A Star" 6 to 2 inches. Washington Red Cedar Shingles, price per thousand, $3.10. Special prices on Bevel Siding or Clap Boards, Red Cedar Siding, White Pine Siding, etc.

FREE

5000 Bargain Catalog—

GORDON-VAN TINE COMPANY

736 Federal St., Davenport, Iowa

Send me your Building Material Catalog FREE

Name______________________________

Address____________________________

Write a Postal or Send This Coupon

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

The Ideal Floor Sanding Machine

An electric floor sander, principally of steel construction, fitted with an automatic dust collector, and with a capacity of surfacing about 5,000 sq. ft. once over in eight hours, has been marketed by the Ideal Floor Sander Co., 105-109 North Canal Street, Chicago, Ill. The machine is equipped with standard motor, which may be detached conveniently and used for any other purpose when desired. Its construction allows for ease in operation and its efficiency makes the cost of maintenance low. An idea of its general construction is indicated in Fig. 1. It will be observed that such parts as ball bearings, chain and sprockets, etc., are covered with a shield to keep out the dirt and dust and to safeguard the operator from possible injury. The sand roller measures 8 x 15 in., running on liberally proportioned ball bearings, and is directly connected to the motor by a silent chain drive. A patented feature of this machine is the self adjustable provision made for holding either light or heavy paper without the use of packing. It is made to surface within 1½-2 in. from the wall, and closer work may be accomplished by the attachment of a smaller roller to either end of the larger roller. The frame of the machine is entirely of steel, and is therefore immune from cracking. At the back of the motor will be noticed an elbow. The suction fan operating as an automatic dust collector discharges all the dust into a large linen bag, which is properly connected to the elbow. On the handle an adjustable pressure regulating device is provided to control the amount of pressure on the roller for light and heavy cutting, and for rough and fine floors. Once the lever is adjusted the floor is assured of a uniform treatment. When the lever is pulled right back the roller is raised from the floor, permitting the replacement of sand paper on the roller. When in operation the machine has the natural tendency to move forward due to the revolving roller. By adjusting the lower lever on the handle a brake controls the speed of the machine. The company will be glad to furnish readers of *The Building Age* with particulars of its product and of its five-day free trial offer.

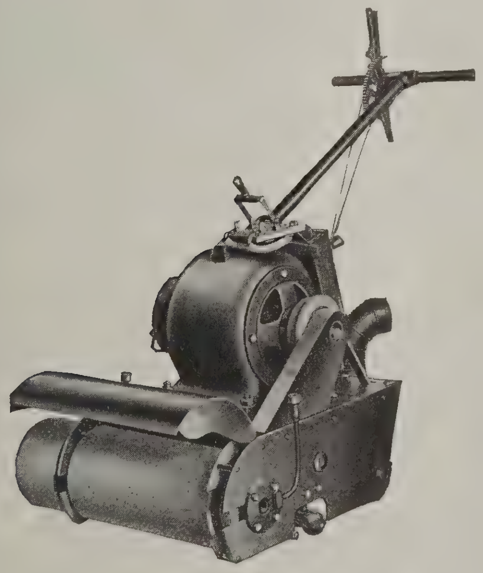


Fig. 1—The Ideal Floor Sanding Machine

Stanley's No. 239 Dado Plane

The Stanley Rule & Level Company, New Britain, Conn., has just added to its already extensive line of mechanics' tools the No. 239 dado plane which we illustrate in general view in Fig. 2. This plane is fitted with a double spur which prevents splintering when working across the grain of the wood and insures a smooth clean cut. It is provided with an extra cutter, being in fact only 1-8 of an inch wide, thus making it an ideal tool for blind wire grooving as well as for many other purposes which will readily suggest themselves to the practical mechanic. A depth gauge is also attached to the tool, thus allowing a groove to be cut of ony desired depth up to the limit of the plane which is ½ of an inch. The tool here shown is 7½ in. in length; weighs only 1 lb. and will be found of special interest to electricians or others having occasion to run wires in connection with house construction.

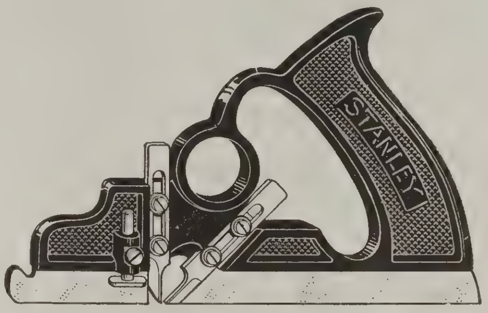


Fig. 2—Side View of Stanley's No. 239 Dado Plane

A Prize Plan Book

Those who are interested in designs of attractive dwellings ranging all the way from the modest three-room bungalow to the stately mansion will find much to hold their attention during the long winter evenings now at hand in the Prize Plan Book, price 10 cents, which is offered by Hewitt-Lea-Funck Company, "manufacturers of forest products" and "designers of homes for the people," Fifth Avenue and Union Street, Seattle, Wash. The reason it is called a Prize Plan Book is because the ideas contained within its covers were obtained in a prize contest. When the members of the firm who had been engaged in selling lumber through local yards for 45 years decided to sell direct to the consumer they reached this decision because they had come to the conclusion that the old method was radically wrong. The idea of service became at once the guiding thought of the company and it was determined that in no way could it be of greater service than in the planning of practical homes for its customers. A prize of a carload of lumber was offered to the person submitting the plan which seemed most suitable for the average American family and as a result hundreds of plans were received. While no one of the plans so submitted was in every way desirable yet in the aggregate they furnished many excellent ideas which were incorporated with other ideas to make a large assortment of practical homes at moderate cost. In figuring the costs shown in the book Seattle wages were used as the basis. The expert architects and carpenters employed by the company calculated the labor days and hours which should be required for each job and their figures are based on these calculations. In order to afford an interesting comparison the prevailing wages for skilled labor in Seattle are published together with the prevailing contract charges. In connection with each design there are shown floor plans and photographic exterior view, also a brief description is given with estimate of cost of various parts of the work. While $2 is charged for the plans the company prefers to consider it as a deposit rather than a fee, because there is no intention to make a charge when materials are bought. The $2 collected for the plans is allowed as a credit upon the first purchase of lumber, mill work or other materials, amounting to $25 or more and a certificate to this effect is given by the company when acknowledging the purchaser's remittance and forwarding of the plans. The company tells "how to build a house without extras" and suggests that those interested secure free copies of the literature which it has issued as it will be found helpful. The lumber price list which is included has been prepared for the benefit of lumber users and contains in addition to prices grading rules, illustrations showing cross sections of special shaped lumber and mill work, and much valuable information of value to builders. There is also a helpful plan sheet, a silo folder and a special barn plan folder, the price of the latter being 4 cents. The company is also sending out a mill work catalogue in which emphasis is laid upon the statement that lumber, mill work, shingles and other building materials made in the Hewitt-Lea-Funck Company's saw mills and millwork factories are sold direct to the user at "one profit prices."

Sanitary Flush Doors

A style of door which is said to be both fire and sound retarding, and especially adapted for hospitals and schools, as well as for hotels, offices, public buildings and high class residences, is that which is being introduced to the attention of architects and builders by the Hyde-Murphy Company, with main office and factory at Ridgway, Pa., and with New York office at 507 Fifth Avenue. It is known as a sanitary flush door and in Fig. 3 of the engravings we show a door partially finished and with some of the core exposed. The core of the door is built up of narrow strips of white pine securely glued and doweled together with edge strips of the same wood as the face veneers. The core is dressed to the required thickness and then both faces are covered with 1/8 in. edge-glued veneers applied under hydraulic pressure. When thoroughly dry and seasoned, the door is sanded and polished to the proper thickness. The company points out that in the manufacture of flush doors the essential features include a careful selection of material, improved methods of cross framed construction and rigid inspection during all stages. The company has an extensive plant at Ridgway covering more than three acres of floor space and equipped with modern electric-driven machinery.

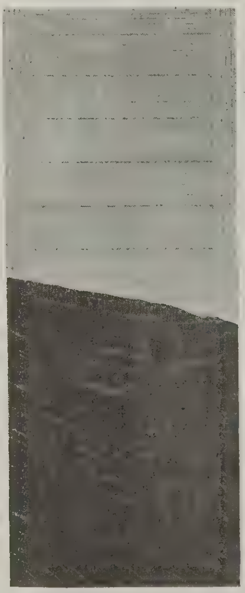


Fig. 3 — View of a Partially Finished Sanitary Flush Door

Metal Batten Strips

An improved form of metal batten strip made from galvanized steel and formed in such a way as to provide for contraction and expansion has just been placed upon the market by the Milwaukee Corrugating Company, Milwaukee, Wis. These metal batten strips, a general view of one of which is presented in Fig. 4 will not warp like wooden strips, neither will they slip or draw away from the boards. They are applied directly to the siding with small nails and make neat weather-proof as well as rat-proof joints. The strips are furnished in 8 ft. and 10 ft. lengths and can be used for lining grain bins or wagon boxes.

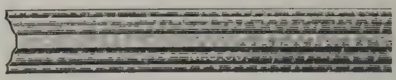


Fig. 4—A Metal Batten Strip

A Double Arbor Rip and Cut-Off Saw

A machine embodying many interesting features from the standpoint of the woodworker is the double arbor rip and cut-off saw which we illustrate in general view in Fig. 5 and which is made by the Beach Mfg. Company, Montrose, Pa. The frame may be either of iron or wood according to preference of the prospective purchaser. The iron frame is heavy and cast in one piece, while the wood frame is made of black birch or rock maple and is very rigid. The table, which is made of hardwood and is securely cleated, is mounted on the company's anti-friction rollers and may be locked for ripping. A removable throat 5 in. wide extending the entire length of the table is provided so as to permit of the use of dado beads. The arrangement of the arbors is somewhat different from that usually found in connection with saws of this class. The revolving frame carrying the arbors is journaled in a second frame which in turn is supported by a shaft at the rear of the machine and guided by a slotted iron bolted to the main frame in front. The weight of all these parts is evenly balanced by two coiled springs on the supporting shaft at the rear of the main frame. By this arrangement the working arbor is belted direct from the countershaft at the rear of the machine and no idlers or tighteners are necessary. The unused arbor is always at rest, the belt passing clear of the pulley on either side and the raising and lowering movement is independent of the revolving movement. This permits of a direct and positive support for the bearing next to the saw. The boring attachment is entirely independent of the saw table. The arbor is fitted with a 1/2 in. hole, has a horizontal movement of 6 in. and is operated by either the foot or a hand lever.

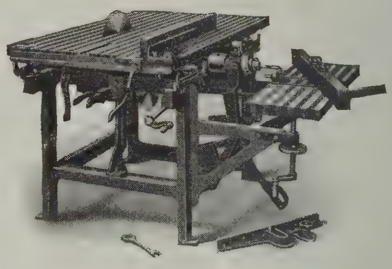


Fig. 5—A Double Arbor Rip and Cut-off Saw

Millers Falls New Ratchet Hand Drill

Some attractive and rather ingenious drills have recently been added to its already extensive variety of such articles by the Millers Falls Company, Millers Falls, Mass., and in Fig. 6 of the engravings we present a general view of one of the most striking of them. It is known as No. 306, is strong and correctly proportioned, has solid steel frame and is handsomely finished with stained hardwood, nickel and distinctive painting of the large gear. The drill has a ratchet of new design which is referred to as being very simple and effective, operating either to the right or left by lifting

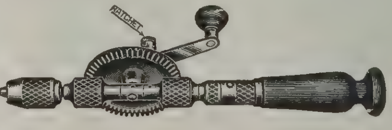
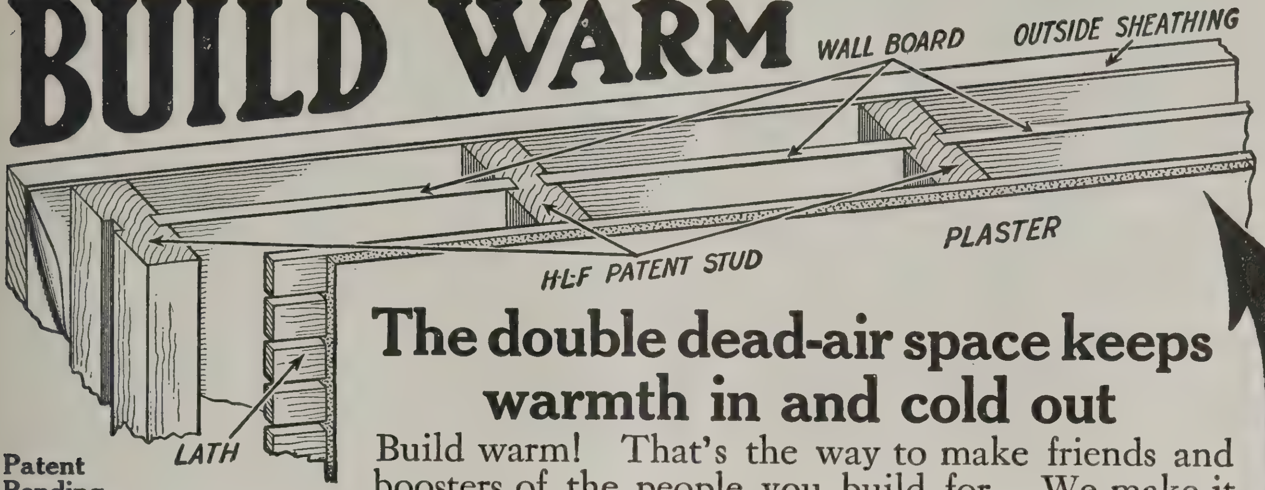


Fig. 6—Millers Falls New Ratchet Hand Drill

(*Continued on page 74*)

BUILD WARM



Patent Pending

The double dead-air space keeps warmth in and cold out

Build warm! That's the way to make friends and boosters of the people you build for. We make it easy for you to build warm and make it inexpensive for the builder, with H.-L.-F. new stud and wall board construction (patent applied for). We ask no royalty, and sell you the material at our usual low prices.

H.-L.-F. stud and wall board costs 25% to 50% less than back plaster

And it's *better* than back plaster. Back plastering simply makes the outer wall warm. H.-L.-F. construction *makes your house* twice as warm by providing two dead-air blankets to keep out cold. H.-L.-F. stud and wall board construction is easy to use. Studs are accurately milled to take the wall board and the wall board is especially made exact size required. Slip it into place, raise your wall, and there you are. No fuss, no muss, no delay—and, best of all, absolute insurance against cold. Get a price on this construction for the houses you are figuring on. It will help you get the jobs.

No advance in lumber prices Send lists quick for prices

Until further notice, summer prices, which have brought us four times as much business this summer as last, will continue. No telling what the war will do to prices later on. Get *your* orders in *early*. We have sold several thousand cars of lumber in less than three years, because our prices are right, our lumber is right and our treatment of the carpenter and the builder is right. Our price is low because through our officers we own and control forests, saw mills, logging railroads, and millwork plants, and sell direct at one small profit. *Find out* how much we can save *you*. Send your lists of schedules quick, for freight-paid quotations at the low price.

Double quick shipments from big stock

Orders are filled by us within 48 hours. Delivery is a matter of only 2 or 3 weeks. A. W. Prust, Wilton, N. D., wrote us July 29th, 1914: "Received the carload of material O.K. *It came sooner than I expected by about four days.* I am saving about $250 on lumber by ordering from you, and, furthermore, I will not have to wait for material, as these local yards do not have the lumber on hand and they hold up the job." Hewitt-Lea-Funck Co. will save *you* money and guarantees you clean, good lumber. We let you see lumber before you accept, and guarantee satisfaction, or money refunded. Get our prices on your lumber. Use the coupon. Write today.

Send coupon for Prize Plan Book

Gives pictures, floor plans, accurate descriptions and guaranteed costs of 100 good practical homes. Will save you a thousand dimes and get you business. Yours for ten cents, and the coupon.

Barn Builder's Guide

Gives pictures, floor plans, full information including guaranteed costs of barns designed by H.-L.-F. Co.'s expert architects. Shows and explains Mr. Fleming's famous gambrel-roofed barn—no posts or tie rods. Sent for 4c.

H.-L.-F. Silo Folder

Here's a double wall silo originated by H.-L.-F. Co., that means no freezing of silage and costs 50% less than stave silos. Already hundreds of farmers have ordered the silo.

It's a big winner. Send coupon, get this folder, then go out and get the orders.

Hewitt-Lea-Funck Company 359 Crary Bldg., Seattle, Wash.
Capital $1,000,000

H-L-F SEATTLE

Hewitt-Lea-Funck Company,
359 Crary Bldg., Seattle, Wash

Gentlemen:—Please send me the following:

[ ] Approximate cost of H.-L.-F. stud and wall board construction for house I intend to build. Width of house______ft.; length ______ft.; height of walls______ft.; number of outside doors______; number of windows______.

[ ] Prize Plan Book (send 10c) [ ] Barn Builder's Guide (send 4c)

[ ] Delivered, freight-paid price on enclosed list of materials (no charge)

[ ] Lumber Price List and Millwork Catalog (free)

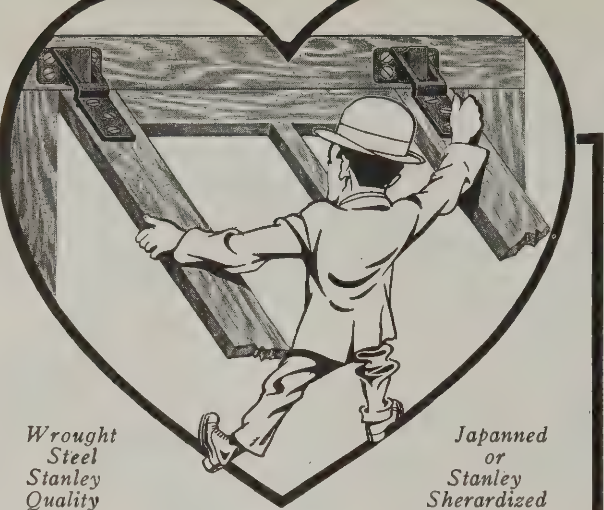
[ ] H.-L.-F. Silo Folder (free)

Name______

Street or R. F. D. No.______

Post Office______ State______

Business ______



Wrought Steel Stanley Quality

Japanned or Stanley Sherardized

"PEERLESS"

Storm Sash Hangers and Fasteners

No. 1717 Hangers.
No. 1719 Fasteners.
The No. 1719 Fastener is made in 5-inch and 10-inch sizes. The 5 inch for 4-foot windows and smaller — the 10 inch for windows over 4 feet.

Just the hardware you want for your Storm Sash. Once applied, no tools are needed to take down or put up the Sash. Full length screens can be hung on the same hooks. The Fasteners hold the Sash firmly in place either open or closed.

Write for Circular "E." It tells the whole story.

THE STANLEY WORKS
New York New Britain, Conn. Chicago

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895

TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

and turning to the right and left respectively the cap to a small boss on the crank handle. This is clearly indicated in the illustration. The arrangement is such that the tool will be found convenient in cramped places or when doing delicate work. The main handle is hollow and quickly detached and holds twist drills up to the capacity of the chuck; namely, ¼ in. The gears are cut, the small ones being of steel and almost totally enclosed as a protection against dust and dirt. The small gears comprise a working one and there is an idler to equalize the outward thrust of the large gear. The chuck contains three jaws operated by springs that are protected from injury and will not get out of order. They hold and center accurately round shanks from zero to ¼ in. in diameter. The length of the entire tool is 12½ in. and without the handle it measures 8 in.

Recent Developments with Roberds Ideal Wall Board

Among the recent improvements in Roberds Ideal Wall Board is the development of a special finish which reproduces the natural grain and color of quarter sawed golden oak. In this form wall board meets a growing demand as it can be used for wainscoting, paneling and interior finish, giving it is claimed an exact imitation of selected hardwood. It is pointed out that a single coat of varnish is all that is required to finish a job of this kind so perfectly that it will defy detection by any but the most skilled eyes. Roberds Ideal Wall Board has been an evolution from comparatively light weight board to its present form consisting of four thicknesses of fiber board united by three layers of asphalt cement. The board is referred to as being unusually strong, tough and uniform and has been found to give entire satisfaction as a substitute for lath and plaster as well as for sheathing frame buildings.

There have recently been some important changes in the organization of the Roberds Mfg. Company of Marion, Ind., whose product we have referred to, Mr. Roberds making announcement that arrangements have been completed to enormously increase the output for the coming year. In order to take care of this increased product Mr. Roberds is making a very interesting proposition to contractors and builders in towns in which his company is not now represented. Details of this proposition can readily be obtained by those who are interested.

Disston's New Flooring Saw

A new flooring saw which has recently been placed upon the market by Henry Disston & Sons, Inc., proprietors of the Keystone Saw, Tool, Steel and File Works, Philadelphia, Pa., is illustrated in Fig. 7 of the engravings. The blade of the saw is reversible, interchangeable and adjustable to various positions, it being held firmly in place by a patent bolt and ratchet. The handle is of cherry and is carved and polished. It is designed especially for cutting out sections in floors, partitions or ceilings and is known as the "D 19 Flooring Saw." Not only is work of the character indicated done rapidly and with much less trouble than by the old method of boring holes and chiseling, but sections cut out with the saw can be replaced in the original position if so desired. The saw is made in 16, 18 and 20 in. lengths, thus adapting it to varying requirements.

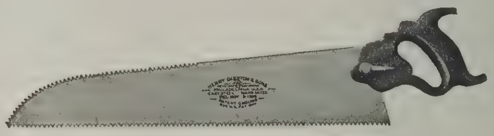


Fig. 7—Disston's New Flooring Saw

A Covering for Piazza Floors and Bungalow Roofs

Home builders in every part of the United States are relying more and more upon local contractors to supply plans and specifications and recommend materials to be used in the actual construction of their homes. It is a very difficult thing to choose the best material for covering porch floors and roofs unless one

(*Continued on page 76*)

Bringing in the Evidence

94 Miles a Day in the Paint Trade

Jersey City, N. J., May 28, 1914.

Our Reo Motor Truck is doing very well, some days making as many as 7 trips, long and short, and covering as much as 94 miles a day. It has given us very good satisfaction. We trust it will do even better service for us in the hot weather, when horses give out so quickly.

New Jersey Paint Works,
Per H. C. Louderbough.

Garment Makers' Truck Never Out of Commission

Huntington, W. Va., August 29, 1914.

The Reo Truck which we have in use, and which we purchased from you, is in splendid shape. With it we are doing the work which required one team all the time and an additional team part of the time, and the work is being gotten out much more promptly with the truck than it was formerly.

It has never been out of commission a single day since we purchased it over a year ago.

Watts, Ritter & Company,
Manufacturers of Peerless Overalls, Shirts and Pants, and Jobbers of Dry Goods.

Paying for Itself Hauling Builders' Supplies

Far Hills, N. J., August 27, 1914.

The Reo Truck purchased from you about three months ago is giving us perfect satisfaction, taking the place of four or five horses and giving no trouble whatsoever. We find that the cost of upkeep has been very small in comparison with what we expected before we purchased the truck. It has already saved us considerable money towards the purchase price that we paid for it. We feel that perhaps we could be persuaded, without a great deal of effort, to purchase another of the same kind.

L. V. Ludlow & Co.,
Coal, Lumber and Builders' Supplies.

A Satisfied Builder

Paterson, N. J., May 28, 1914.

Replying to your favor of May 22nd, in regard to the Reo Motor Truck, which we purchased some time ago, we take pleasure in stating that we have been using this truck for a number of months, and have found it very satisfactory in connection with our work and will recommend same to any one who is desirous of purchasing a truck of this description.

The David Henry Building Co.,
Per S. Williams, Secy. and Treas.

Heavy Loads—Bad Roads

Shickshinny, Pa., August 29, 1914.

Our Reo Motor Truck is giving perfect satisfaction over these Pennsylvania hills, which are hard on a motor car, as we have such abominable roads. Nothing about the mechanism has given us any trouble whatever, and we can and always do recommend it very highly to others.

J. B. Anderson & Son, Millers.

Lumber Dealer Enthusiastic

Benton Harbor, Mich., August 27, 1914.

I am more than pleased with my two Reo trucks, and do not see how I could get along without them. I do not make a practice of overloading my trucks, but once in a while it is necessary, and I have hauled as high as 8800 pounds of lime on one load—just to see what the Reo would do. Have not spent one cent for repairs on either truck.

W. A. Preston,
Manufacturer and Dealer in Lumber.

Giving Exemplary Service—Will Install Another Model J

Bristol, Va.-Tenn., August 10, 1914.

We have had a Reo Model J two-ton truck in continued service since March, and are making an average of 48 miles per day with it in our delivery. The oil and grease consumption has been very light. Our average load is from 2000 to 3000 pounds. We have had no trouble whatever, and have not spent a cent for repairs. It has been doing our work to our satisfaction, and in all probability we will put another one of these trucks in service next spring.

Bristol Ice Cream Company,
By A. E. Fuller.

The thousands of merchants who have found the solution of their hauling and delivering problems in the Reo two-ton truck were doubtless one-time skeptics.

Quite possibly they once looked askance at its claimed superiorities — the saving in time, the efficiency it adds to every department of the business and its ability to key up an entire institution to a quicker step.

But once tried and personally compared with the old-fashioned team hauling, these Reo truck owners are of one voice in their testimony.

The verdict is unanimous. In over 175 lines of business the Reo truck has become a permanent factor of efficiency and economy, and its well earned fame has made it the leading two-ton truck in point of sales in America.

It is no source of surprise that merchants everywhere, benefited by the Reo, should express their satisfaction without reserve, and their experience should have the utmost weight with intending purchasers of motor trucks.

Reo Model J

Two Ton Capacity **$1650**

F. O. B. Lansing

Chassis with Driver's Cab. Body Extra

Write for catalog and booklet of users' experience.

Reo Motor Truck Co.

Lansing, Mich.

Straight Talks
on
Durametal Weatherstrips

¶ You contractors—carpenters and building owners—why not buy weatherstrips direct from the manufacturer and do your own installing?

¶ By our unique plan, we have cut out the usual big selling expenses, which enables you to buy direct from us, make a profit on the strip and good money on the installation besides.

¶ Durametal Weatherstrips have been successfully sold for over 10 years, and have stood every possible test. Their durability and simplicity make them superior to all others.

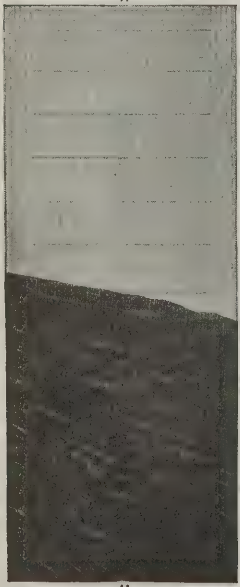
¶ Made of best heavy zinc, and fully guaranteed. Write for samples and prices now before you turn another page. There's money in this for YOU.

A few agencies open to responsible, live, local contractors and carpenters.

Durametal Weatherstrip Co.
12 East Austin Ave., CHICAGO, ILL.

Sanitary Flush Doors
Fire and Sound Retarding

Best for Hospitals and Schools; unexcelled for Hotels, Offices and Public Buildings; equally well adapted for high-class Residences.



Specifications:

Form cores of Veneered Doors having plain surfaces with narrow strips of sound Chestnut or White Pine, glued, cross-framed and doweled together, with edge strips of same wood as face veneers. Keep cores at proper temperature until glue is set and all surplus moisture evaporated.

Dress Cores to required thickness, with uniform and true surface, and cover both faces with 1/8-inch edge-glued veneers, applied under hydraulic pressure; when thoroughly dry and seasoned, sand and polish to required thickness.

Doors having openings for glass to be framed up and veneered as above specified, with glass moulds mitered around openings.

Specify and insist upon a construction as outlined and you will secure best results.

Hyde-Murphy Co.
Ridgway, Pa.

New York Office:
507 5th Ave.

Pittsburgh Office:
6101 Penn Ave.

is thoroughly posted on the relative advantages and disadvantages of shingles, slate, tar felts, cotton ducks, etc. After several years' experience with various kinds of materials, many builders appear to have come to the conclusion that a cotton fabric covering is very satisfactory for the purpose. The porch roof is exposed to every twist, strain, and savage tug of the elements and subjected to the continual wear of wind, sun, rain and ice. Unless the roofing surface used possesses unusual qualities it is very apt to be broken down in a short time, and a leaky roof is the result. Ordinary shingles or slate cannot be used where the roof is flat and railed and where it is used occasionally as a balcony floor. One of the most satisfactory coverings for this purpose is properly prepared cotton duck, for if correctly treated it will not rot or mildew, and thus the only objectionable feature is removed. It has been found possible, moreover, to so prepare cotton duck, by a combination of chemical and waterproof treatments, as to endow the goods with mildew resisting qualities and at the same time prevent the absorption of the moisture which makes mildew and other forms of fungus growths possible. This treatment has also been designed to fill and prime the duck on one side and improve its adhesive qualities on the other so that the laying of the roofing on a fresh white lead or paint film is greatly facilitated and the outer subsequent painting rendered economical and easy. It is so simple and easy to properly lay this canvas roofing material and it costs so little that it is being used in many sections of the country for bungalows, porch floors, and roofs, sleeping balconies, garage roofs, etc. The canvas roofing material furnished by the William L. Barrell Company, 8 Thomas Street, New York City, is well adapted for this purpose as it is chemically treated so that it will not rot; is very durable, easy to lay, neat in appearance, and can be secured at such a cost that a liberal margin of profit can be made on jobs where it is used. Liberal samples can be secured by any interested architect or builder who may apply for them to the address given.

A Solution of the Garbage Can Problem

The handling and disposing of garbage in the home has been a serious problem home builders have had to contend with for ages. The garbage disposal is rarely thought of during the drawing of the plans or while the building is under construction, but is something the man of the house leaves to the womenfolks after the house is finished. The result is the unsanitary, unsightly, portable garbage can, despite its inconvenience and dangers. The incinerators that have recently come on the market are along the right direction and show the trend of times toward the solution of the garbage

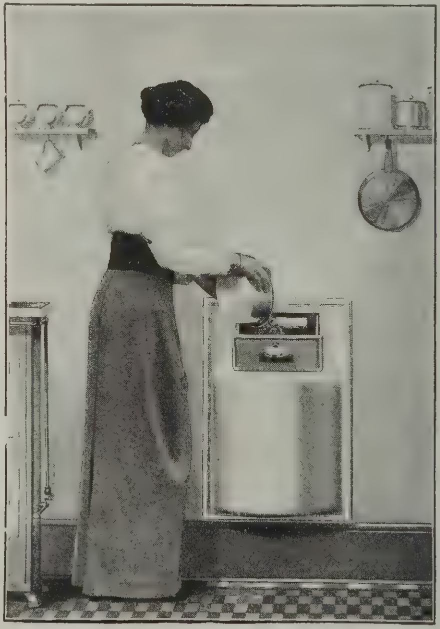


Fig. 8—A Solution of the Garbage Can Problem

(*Continued on page* 78)

IMPOSSIBLE for us to name in a few lines all of the good things we have in the way of the newest and best tools but you should know about

The celebrated Buck Brothers' Chisels and Gouges—ask for catalog No. 3199. The Indispensable Jorgensen Adjustable Hand Screws—ask for circular No. 3200. The old reliable Colts Quick Acting Clamps—ask for catalog No. 3201. The genuine S. J. Addis London Carving Tools—ask for catalog No. 3202. Work Benches—ask for catalog No. 3203. Mitre Boxes—ask for catalog No. 3204.

We also carry regularly all the Yankee Tools, Stanley Rule and Level Co.'s and Miller Falls Lines, Hammond's Hammers and Hatchets, Russell Jennings' Bits, etc. You can purchase from us in one order all the best tools that the market offers. Correspondence invited.

HAMMACHER, SCHLEMMER & COMPANY
HARDWARE, TOOLS AND SUPPLIES
Fourth Avenue and 13th Street New York, Since 1848

YOURS FOR THE ASKING—
A COPY OF OUR

1914
Suggestion Book

Featuring Morgan Hardwood Doors, showing complete Layouts and Glass Sizes for all Hardwood Doors of Stock Design, also a double-spread color chart showing actual reproduction from Finished Wood Panels treated in accordance with our Specifications.

Morgan Doors are architecturally correct, and we are so proud of our product that we stamp the name "MORGAN" on the top-rail of every Hardwood Door we manufacture.

Morgan Sash & Door Company
Department C-31, CHICAGO, ILL.

Factory:
Morgan Company, Oshkosh, Wis.

Distributed by
Morgan Millwork Co., Baltimore, Md.

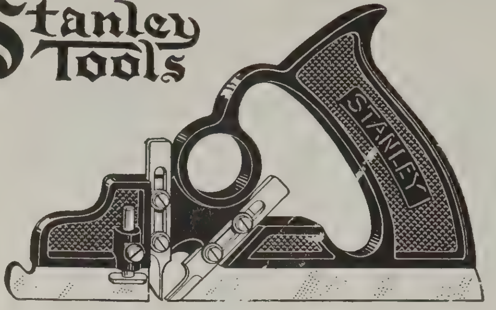
New York Office: Craftsman Bldg., No. 6 E. 39th St., New York City.

Architects see Sweet's Index, pages 972-973

Featuring "Morgan" Interior Design M-59
Can be made from any kind of wood

Copyright 1914 Morgan

Stanley Tools



No. 239 Dado Plane
A New Stanley Tool

This Plane has an extra narrow cutter, only ⅛ of an inch wide, making it an ideal tool for blind wire grooving as well as for many other purposes.

It is fitted with a double spur which prevents splintering when working across the grain and insures a smooth, clean cut.

A depth gauge is also attached allowing a groove to be cut of any desired depth up to the limit of the plane—½ of an inch. Length overall 7½ inches—weight 1 lb.

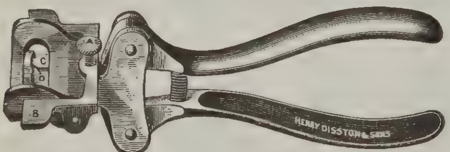
Price, Each, $2.20

If you cannot procure same from your Hardware Dealer we will be pleased to forward you one, postage prepaid, upon receipt of price.

Address

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

The Disston Tools You Need to Sharpen Your Own Saws

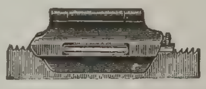


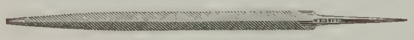
The "Triumph" Saw Set

Enables anyone to properly set a saw. It is simple and easy to operate. Complete directions with each one.

The Hand Saw Jointer

is necessary to keep all the teeth to a proper and equal height. Cut shows how it is applied.





DISSTON Taper Files

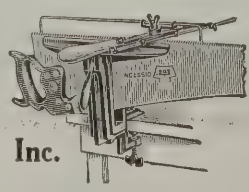
give the best results. They cut fast, give a smooth finish to the work, and are the most durable files made.

The Filing Guide

holds the saw in position and guides the file correctly. The most unskilled saw filer can get good results with this guide. Comes in two sizes. The heavy D 3 has 12½-inch jaws, while the lighter guide, D 2, has 9½-inch jaws on clamp, and weighs only 7 pounds.

Send for "Hand Saw Booklet." Tells how to file saws.

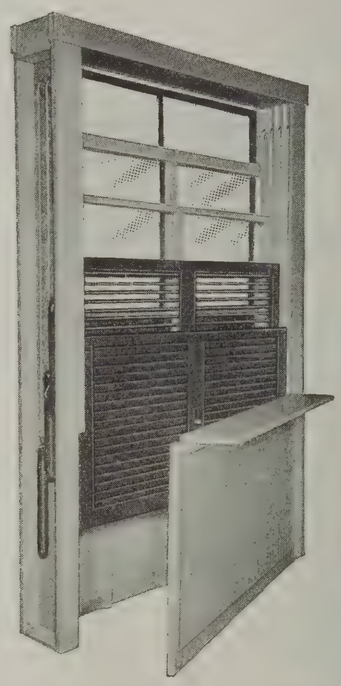
HENRY DISSTON & SONS, Inc.
PHILADELPHIA, U. S. A.



evils. The Majestic Company, 504 Erie Street, Huntington, Ind., has, after many years of experiment, finally succeeded in perfecting a sanitary garbage receiver to be built into a home that is practical and convenient, yet so moderate in cost that the owner of a modest cottage of $3,000 can easily afford to install one. It consists of an iron cabinet or case that serves as a container for the regulation galvanized garbage can and is built into and through the kitchen wall. Note the illustration, Fig. 8, which shows the inside kitchen view. Here you see the woman emptying the garbage without leaving the kitchen, yet the can is out of sight. Every time the receiving door is opened a quantity of disinfectant is sprinkled over the contents, keeping everything sanitary. The case from the outside has the regulation door from which the garbage man takes out the can for emptying. The receiver is fly, insect and dog proof, and answers in every way the long-felt want of a practical and convenient method of caring for garbage. It is best to include one in the plans and arrange for its installation while the building is being erected. But it can very easily be installed in any ready built home with very little trouble or work.

The Add-a-Room System

At a time when sleeping porches are fast becoming a necessity to modern residences, the following description of the Add-a-Room System, now being put on the market by the Wendelken Manufacturing Company, Marietta, Ohio, will doubtless prove interesting. The principal feature that the inventor of the system brings out is the fact that the room can be used in all kinds of weather, and the adjustable steel blinds can be closed tightly or set at any angle, thus insuring a free cir-



The Add-a-Room System. Fig. 9—Showing Construction of Sash Pocket

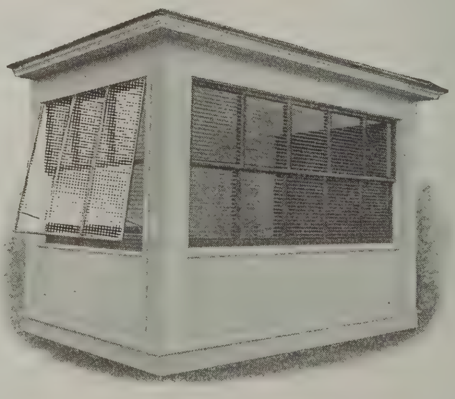
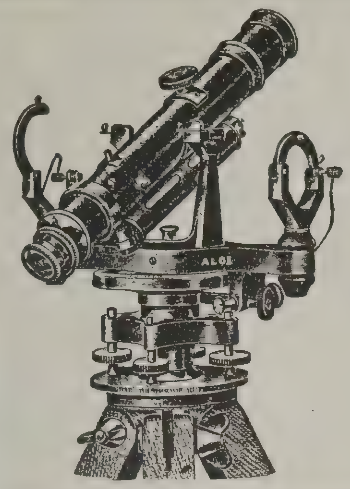


Fig. 10—General View of the Complete Structure

(Continued on page 80)



Rent this Level 10 Months Then It's Yours

Builders—Contractors

This is not the old style Architect's Level. It is the newest model *convertible* level. There is not a single Builder or Contractor who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder or contractor can use the Convertible Level, sent free on request.

WARNING

The Level we offer is the new Aloe Convertible Level. Don't confuse the Convertible Level with the ordinary style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified transit and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

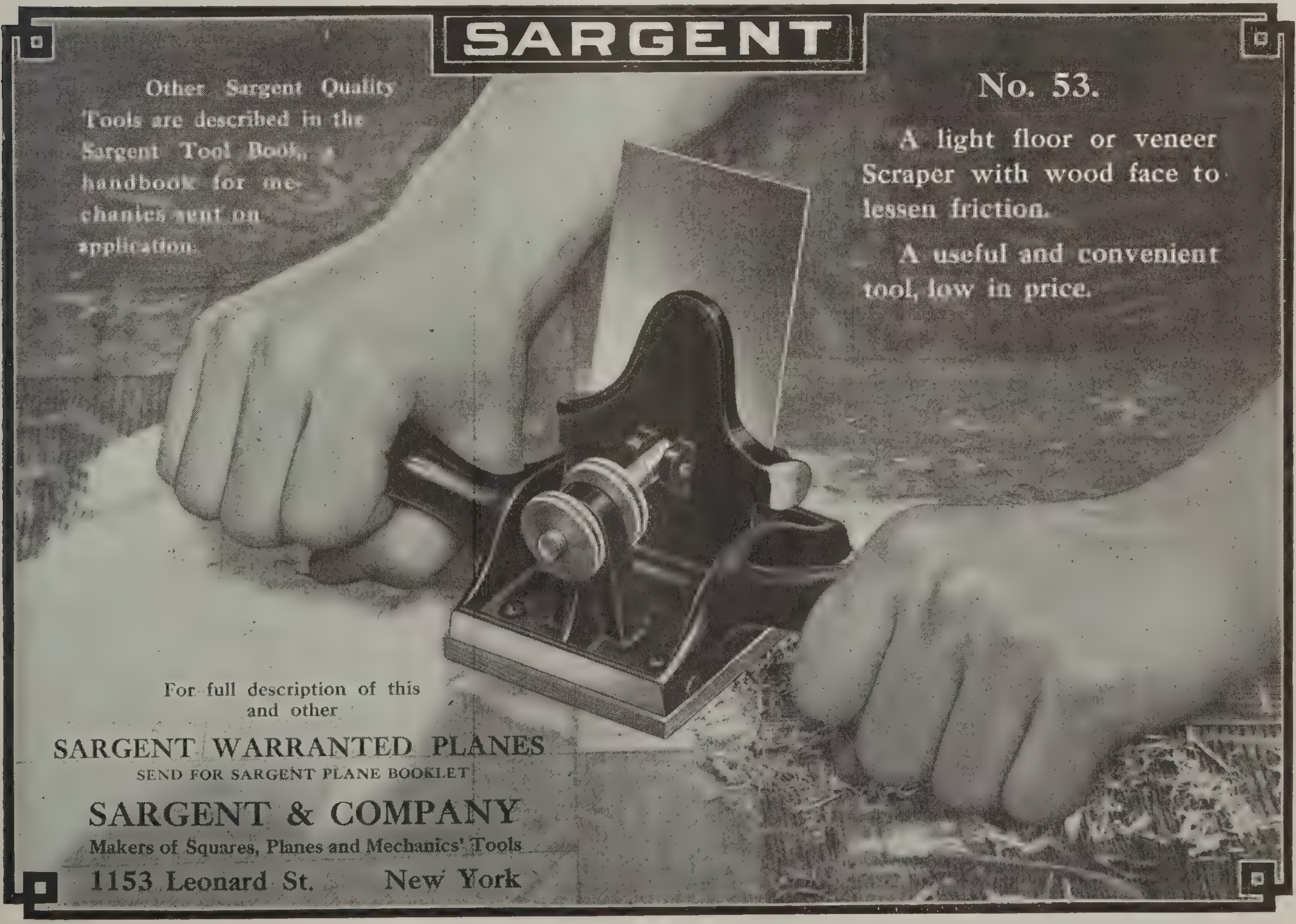
A. S. Aloe Co., 625 Olive St., St. Louis, Mo.

COUPON

A. S. Aloe Co.,
625 Olive St., St. Louis, Mo.

Please send free instruction book on the use of the Convertible Level and complete details of your rental plan. This request in no way obligates me.

Name ....
Occupation ....
Street ....
City.......................... State..........
B. A., Nov., '14.



SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.

No. 53.

A light floor or veneer Scraper with wood face to lessen friction.

A useful and convenient tool, low in price.

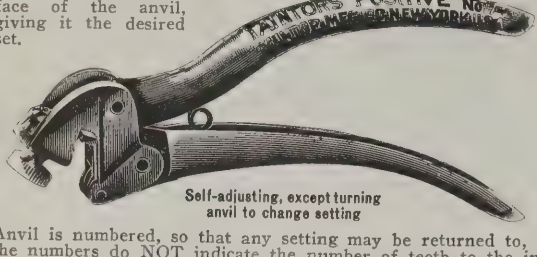
For full description of this and other

SARGENT WARRANTED PLANES
SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

DO YOU WANT A SAW SET?

If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.


TAINTOR'S POSITIVE No.
TAINTOR MFG. CO. NEW YORK U.S.A.

Self-adjusting, except turning anvil to change setting

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.

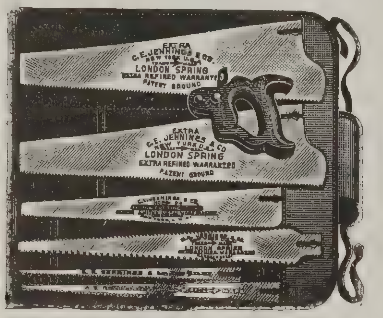
Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., New York

C. E. Jennings Arrow Head Combination Sets of SAWS

Adjustable Handle



No. 131. Comprising Panel, Rip, Compass, Keyhole, Metal Cutting and Pruning Saw Blades.

The feature of these Sets is the Adjustable Handle which will hold any of the Blades. The lever turns the screw that locks the Blade in place. These sets of Saws are desirable for mechanics wishing a Set of Saws that will not take up much room, or for household or camp use, or for work about a farm, etc.

Packed one Set in a Box or Leather Case If So Ordered Extra.

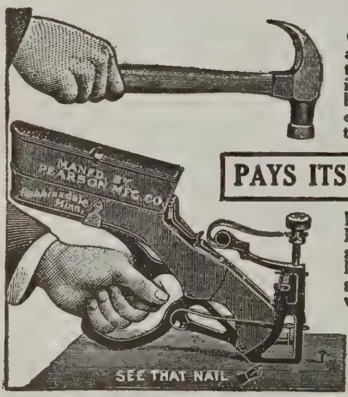
We will send a set by parcel post if your dealer cannot supply you.

Send for circular.

Sole Manf's

C. E. JENNINGS & CO., 71-73 Murray St., New York

Pearson's Automatic Shingle Nailer


MANFD BY PEARSON MFG. CO.
SEE THAT NAIL

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only **$5.00** It makes good.

Pearson Mfg. Co.
Robbinsdale, Minnesota

SEND $1.00

for this

remarkably handy tool

"The New Complete Saw Set"

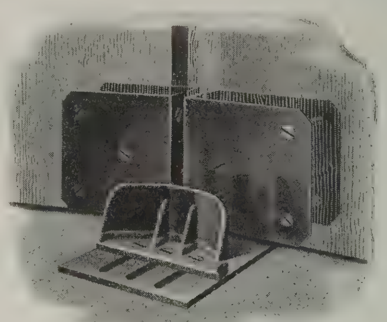
embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending $1.00 for this attractive offer. We prepay postage.

Otis A. Smith Rockfall, Conn.

culation of air in all kinds of weather. Fig. 9 of the illustrations shows the unique method of construction that provides for disappearing sash. In other words, during the summer time the two glass sashes, as well as the metal shutters, can be lowered into the framing or casement and are thus entirely out of the way. The Add-a-Room System includes a screen on the outside that can be easily removed during the winter season. Fig. 10 gives an appearance of the room enclosed. The manufacturer calls attention to the adaptability of this system for constructing a sleeping porch in a residence already built, and also for use in a sleeping room, substituting windows that are already in place. Descriptive matter can be obtained by any interested reader of *The Building Age* upon request.

Floor Guides for Garage Doors

The extent to which garage construction has become a feature of current building operations throughout the country has given a great stimulus to the production of improved fixtures or hardware used in connection therewith. One of these improvements is found in the floor guides for garage doors which have just been placed upon the market by the Richards-Wilcox Mfg. Company, Aurora, Ill., and which are illustrated herewith. In Fig. 11 is shown an adjustable floor center door guide especially adapted for double garage doors and provided with bumper shoes on the doors. This guide is intended more particularly for use with pairs of sliding garage doors, the construction being such that the device guides the bottom of the doors and holds them in place when closed. The guide is adjustable for doors 1¾ to 3 in. thick and is suitable for use with concrete or wood floors. In Fig. 12 is shown a floor end door guide intended more particularly for use with sliding right angle garage doors. This holds the bottom of the doors in position when either open or closed.



Floor Guides for Garage Doors. Fig. 11—Adjustable Floor Center Door Guide

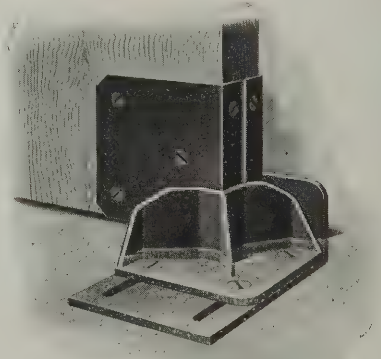


Fig. 12—A Floor End Door Guide

In this case as in the one just described there are bumper shoes on the doors and the guide is suitable for use with either concrete or wood floors.

Installation of Automatic Sash Holders

In the recent past there has been more or less discussion as to some of the many ways in which the carpenter-contractor and the builder could profitably

(*Continued on page 82*)

L. & I. J. WHITE CO.
1837
BUFFALO, N.Y. U.S.A.
L. & I. J. WHITE
1837
BUFFALO, N.Y.

Our Adze

Just try one of them. We want you to see for yourself how much better they are. Send for our Adze folder giving prices.

Always Ask For

WHITE

Ask the Men Who Know

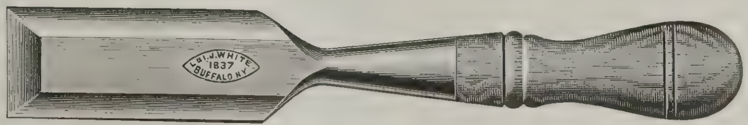
There isn't a man who ever used a WHITE tool that is satisfied with any other. WHY? Just try one yourself and see.

TRADE
L. & I. J. WHITE
1837
BUFFALO, N.Y.
MARK
Look for This Mark

Get What You Ask For

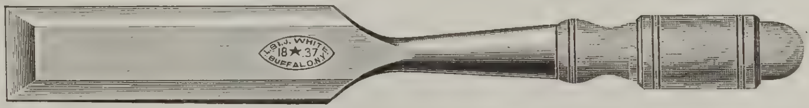
If you ask for a WHITE tool, see that you get it. If your dealer tries to sell you something else, write us. We will see that you are supplied.

No. B-2



The New Short Length Firmer Chisel

No. X-2

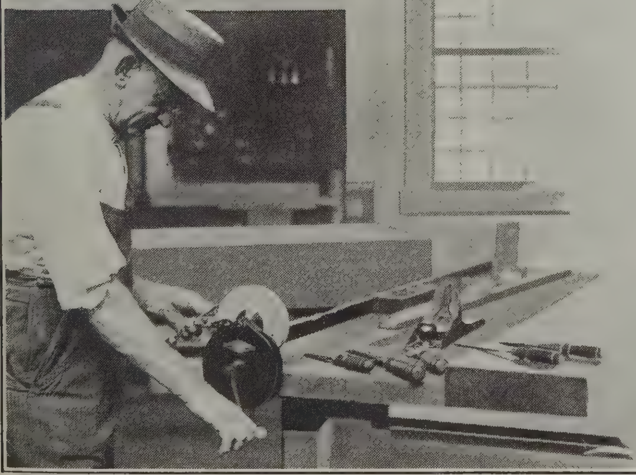


Our Very Best Firmer Chisel

The L. & I. J. White Co., 100 Perry St., Buffalo, N. Y.

THE RIGHT GRINDER WITH THE RIGHT WHEEL

CARBORUNDUM NIAGARA GRINDER



Accurately cut gears make it smooth and easy running — ground-to-a-fit castings make it oil and dust-proof— the malleable handle and clamp give it strength — superior workmanship assures careful assembling—*and every machine is equipped with a*

CARBORUNDUM GRINDING WHEEL

The fastest, cleanest, coolest cutting wheel for general work—every machine has a practical tool rest.

Made in several sizes for the work bench, tool kit or household. Ask your hardware dealer about Carborundum sharpening stones and grinders.

THE
CARBORUNDUM
COMPANY
NIAGARA FALLS,
N. Y.

BY INVITATION
MEMBER OF
NEW YORK, U.S.A.

Compo-Board

Trade Mark Reg. U. S. Patent Office No. 94745

A Money-Saving Repair Material

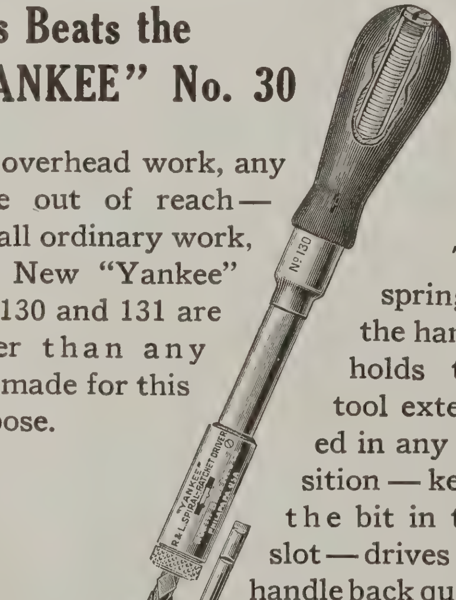
That hurry up repair job—he wants it cheap, and quickly. Compo-Board is the answer. Of course Compo-Board is the best wall lining you can find for a new building. But for the repair job where speed is essential, you can "deliver" best by finishing walls, partitions, etc. with Compo-Board.

You can get exactly the amount you need, in strips 4 feet wide and up to 18 feet long. No waste—no muss from plastering and no waste of valuable time. The decorator can take a room the day you're thru with it.

The corner of this advertisement shows the construction of Compo-Board, the "Wood-Core" wall board. It is non-porous, hence resists temperature changes and fire very well. And the chances are it will outlast the rest of the finishing woodwork.

Sold by dealers almost everywhere. Send for booklet and free sample. Test it yourself.

Northwestern Compo-Board Co.
5778 Lyndale Ave. No.
Minneapolis, Minnesota



This Beats the "YANKEE" No. 30

For overhead work, any place out of reach—and all ordinary work, the New "Yankee" No. 130 and 131 are better than any tool made for this purpose.

The spring in the handle holds the tool extended in any position — keeps the bit in the slot — drives the handle back quickly for the next thrust. To see one is to want it. Let us send you the "Yankee" Tool Book. A postal brings it.

NORTH BROS. MFG. CO.
Lehigh Ave., Philadelphia, Pa.

make use of his time in the slack season, and during the winter months. There are thousands of houses throughout the country which were built without pocket frames in the window openings, and as a result when the sash is to be lifted either a stick must be placed under it as a prop or a nail stuck in the side of the sash, allowing the latter to be lifted from the bottom only to a given hight, where the nail again sticks into an opening in the frame. The point is made that with a little expenditure of time it could be so arranged that either the top or the bottom sash could be easily raised or lowered and the sash held at any open point that may be desired, and this by installing automatic sash holders, which are inexpensive and simply constructed. The only thing that is necessary is to make a mortise in the frame or sash, then install the automatic sash holder, replace the sash and the latter is ready to operate up and down, at the same time securely holding it at any point that may be desired. These holders are made by the Automatic Sash Holder Mfg. Company, Church Street, New York City, and any reader of *The Building Age* who so desires can obtain full particulars on request to them.

A New Derrick For Builders

A new portable one-ton stiff-leg derrick so arranged that it may be operated by hand, horse, or other power, has just been marketed by the Sasgen Derrick Co., 205-7 North Racine avenue, Chicago, Ill. The simplicity of its construction allows it to be taken apart or set up quite easily, and the legs and sills may be swung to any angle desired. Fig. 13 of the accompanying illustration gives the reader an idea of the machine as it appears when set up. It is supplied with a length of boom averaging from 12 to 20 ft., and sills and legs 4 x 6 in. The mast and boom are in two pieces of 2¼ x 6 in. The derrick is equipped with steel fittings, including the double drum geared winch. It is especially strong and light, and an 18 ft. boom will set every stone from 500-2500 lbs., on a 30-ft. front one story without moving the derrick. The boom may be used separately as a tower boom, in which case two extra fittings can be furnished by the company. Catalog "A" will be sent to interested readers of *The Building Age*. It contains much information on derrick construction, each device is well illustrated, and accompanied by prices and descriptions explaining operations.

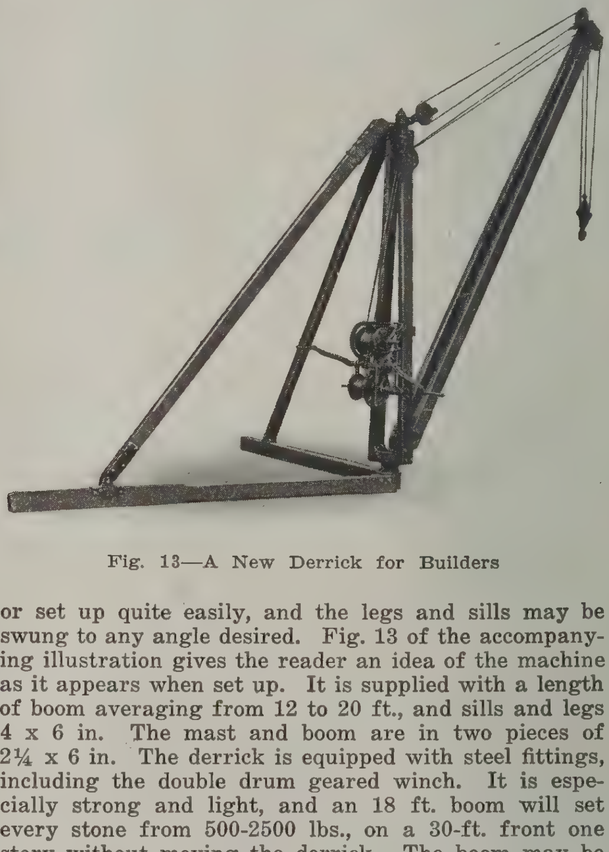
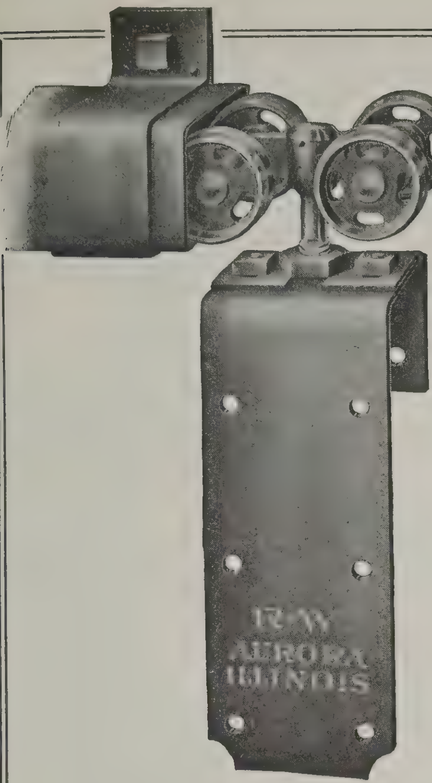


Fig. 13—A New Derrick for Builders

The Finishing Touch

The above is the title of the house organ of the Murphy Varnish Company, Newark, N. J., and one of its chief purposes is to inculcate the value of "quality." The greater portion of the last issue is devoted to an enumeration of the merits of "Univernish," which is the trade name for the universal varnish. It is intended for all purposes, and four colored pictures are intended to show some of its various qualities. One is intended

(*Continued on page 84*)



A New Field

With the multiplication of automobiles, there has come a multiplication of garages. Most car owners have a little garage of their own. A special type of door hanger is usually necessary owing to the large door opening needed and the lack of room for sliding.

R-W
Garage Hangers

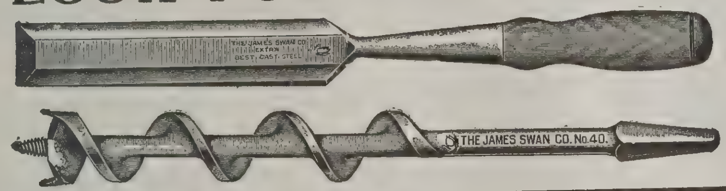
Solve this most difficult problem and build up a big business by using R-W Garage Door Hangers.

There may be some door arrangement come up hard to figure out.

Put it up to us. Send us a rough sketch showing measurements, and we will be glad to tell you what is needed and where to get the hardware.

Richards-Wilcox
Manufacturing Co.
Aurora, Ill. U.S.A.

LOOK FOR THE "SWAN" TRADE MARK


THE JAMES SWAN CO. No.40.

On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.

MACK & CO. LTD

The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

D.R. BARTON 1832 ROCHESTER N.Y.

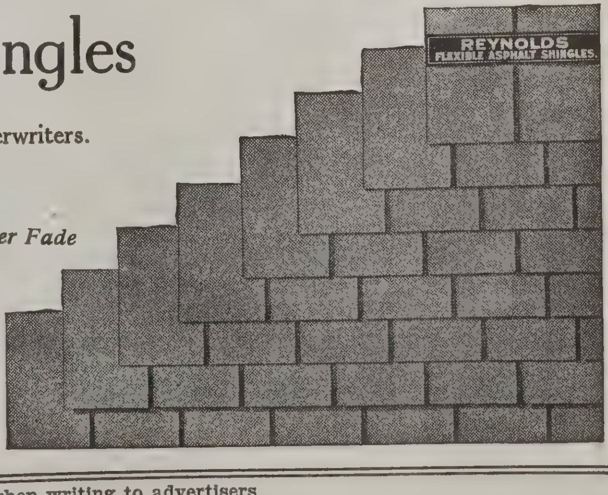
Brown's Race
Rochester, N.Y.

Reynolds Asphalt Shingles
ENDORSED BY LEADING ARCHITECTS
Fire Resisting—Approved by National Board of Underwriters.
GUARANTEED FOR 10 YEARS—WILL LAST MANY YEARS LONGER

Natural Colors of Garnet, Red, Gray and Green, which Never Fade

We are the ORIGINAL MAKERS of Flexible Asphalt Shingles and tested our product for ten years before putting it on the market. Let us send you a booklet.

H. M. Reynolds Asphalt Shingle Co.
West Grant Street, Grand Rapids, Mich.
Established 1868



KEES MFG. CO. BEATRICE, NEB.

KEES
SHINGLE GAUGE

Easily attached to any hatchet. Always accurate. Seven quick adjustments by quarter-inches. Won't work loose. Enables you to shingle fast without a helper. Saves using chalk-line or straight-edge. Made of cold-rolled steel, nickel plated.

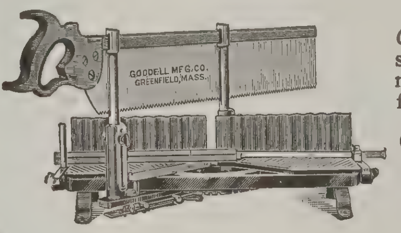
Send 15c Stamps or Coin for Sample. Your Money Back if You Are Not More Than Pleased

F. D. KEES MFG. CO.
BOX 812 BEATRICE, NEB.

MAKERS OF
Kees Metal Building Corners, Siding Clips, Gossett Storm Sash and Screen Hangers. SAMPLES FREE.

Goodell Mitre Box
Made of STEEL—Cannot Break

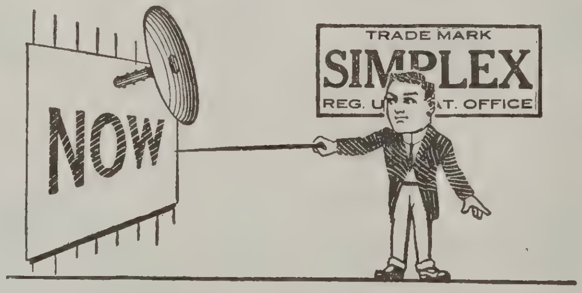
For years this Box has been recognized as being *first in quality and improvements,* and the new STEEL BOTTOM PLATES with ANGULAR SERRATURES to prevent the work from slipping add still more to its convenience and attractiveness.


GOODELL MFG. CO. GREENFIELD, MASS.

Write for new *Circular K* describing this and many other features.

GOODELL MFG. CO.
Greenfield, Mass.

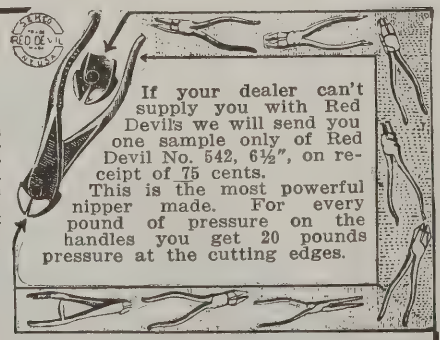
BIGGER NAIL PROFITS



Send for free samples of
SIMPLEX ROOFING NAILS
H. B. SHERMAN MFG. CO. Battle Creek, Mich.

RED DEVIL TOOLS

by their uniform superiority and unconditional guarantee have attained a standard by which others are judged. They are the result of over 30 years' manufacturing experience. The Red Devil Policy is not to see how cheaply they can be produced, but *how good.* To that end we use the highest grade of material and the most skilled mechanics obtainable and maintain an experimental department whose sole object is to give the mechanic the best tool it is possible to produce.
Send for your copy of Booklet of 3000 Red Devils.


SMITH RED DEVIL N.Y.

If your dealer can't supply you with Red Devils we will send you one sample only of Red Devil No. 542, 6½", on receipt of 75 cents. This is the most powerful nipper made. For every pound of pressure on the handles you get 20 pounds pressure at the cutting edges.

SMITH & HEMENWAY CO.
158 Chambers Street New York City

to demonstrate that it is hot liquid proof; another, that it is hot soap suds proof; the third, that it is ammonia proof, and the fourth, that it is hot dish proof. The claim is made that water will not turn it white; that it is clear and limped in the cup and will not skin over, and that it is a perfect architectural varnish for exterior and interior work. The company will, for the asking, send a sufficient quantity for practical examination. "Univernish" avoids the bother and waste incident to the use of two or three varnishes on the same job and is therefore an especial boon to house painters, boat finishers and furniture manufacturers.

Building Materials Made of Rock

The demand for building materials not likely to be affected by fire has encouraged manufacturers to experiment with all sorts of materials with the result that asbestos is brought prominently to the front. It is interesting to note that asbestos runs in veins very nearly parallel to the ground and in thicknesses varying all the way from a mere line to 3 or 4 in. Some of the veins, however, reach a depth of 200 ft. Deposits of asbestos in one or more of its allied species are found to a limited extent in Russia, Italy, Egypt, India, South Africa and many other parts of the world. That which is mined in Canada, however, is of special commercial value as other varieties are either too brittle to utilize or too hard to mine. The largest of the Canadian mines is that operated by the H. W. Johns-Manville Company of New York. The asbestos when properly worked produces long silk fibers which are made into fireproof goods of various kinds, the most familiar doubtless being the asbestos theatre curtain. The asbestos or rock fibers are made into felt which is then saturated with Trinidad Lake asphalt, after which several of the sheets are cemented together with this material and made into ready roofings. For shingles the same rock fibers are mixed with Portland cement and other ingredients, then placed in molds of various sizes and shapes and subjected to intense hydraulic pressure. The various colors are mixed with these ingredients, producing shingles of handsome shades. Asbestos wood or lumber is also made in much the same manner as the shingles. This is furnished in slabs so that it can be easily used for fireproof partitions, fire doors, booths for moving picture machines, etc. Another use made of the material is in stucco, also wall plaster. Here the asbestos fibers take the place of hair ordinarily used and the asbestos rock takes the place of sand. Another material which is fast gaining favor, chiefly because of its fire retarding qualities, is Mastic for floors. The importance of fireproof construction is being appreciated more and more by architects and builders and this is shown by the tremendous increase in the substitution of fireproof building materials for those of an inflammable nature.

"Vandor" Hammers and Other Tools

An increased demand for "Vandor" tools has forced the Van Doren Manufacturing Co., Chicago Heights, Ill., toolsmiths and manufacturers of drop forged hammers of all patterns, to establish a plant in Chicago at 227-233 West Erie street, for the manufacture of light materials, including rods. This will enable the company to devote its entire factory facilities at Chicago Heights to the manufacture of tools. During the past four years the company has built up an excellent reputation for its "Vandor" hammers, and the installation of additional modern machinery at its Chicago Heights plant will enable it to specialize on its hammers with better results than heretofore accomplished. Literature descriptive of modern hammer construction will be forwarded to interested readers of *The Building Age* on application to the company's Chicago office.

Diamond Metal Weather Strip

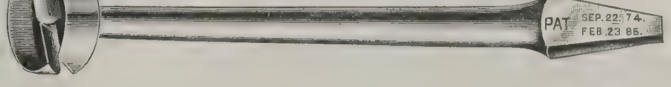
The season of the year is now at hand when house-owners and builders are thinking about weather stripping windows and doors and they are therefore likely to be interested in an attractively illustrated pamphlet in which are set forth the claims made for the Diamond

(*Continued on page 86*)

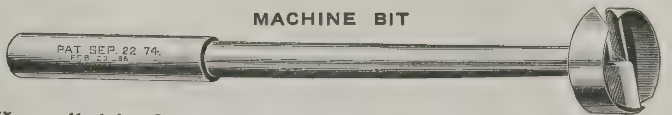
THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.

BRACE BIT


PAT SEP. 22. 74.
FEB. 23 86.

MACHINE BIT



Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

No. 0 PERFECTION

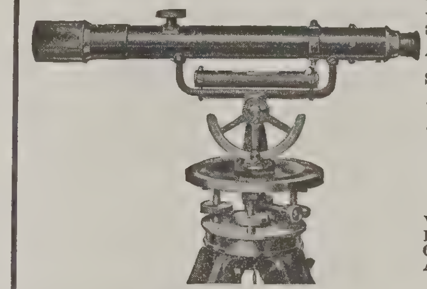
Our vest pocket edition for Carpenters, Plumbers and households; fitted with 4-inch Corundum Wheel. Weight 5 lbs.

Mr. Carpenter, just think for $2.50 you can carry in your pocket a complete sharpening outfit. No dirt—no grease. If your dealer does not carry them, we will send prepaid on receipt of price. We also make six other sizes.

STAR SPECIALTY MFG. CO.
227-233 W. Erie St., Chicago

The Yankee (A Compound Level)

Just the thing for the Arch.-Builder
An accurate level for moderate cost



Runs Horizontal and Vertical Angles.

Sold guaranteed by

Frost-Adams Co.
37 Cornhill, Boston, Mass.

Write for our catalogue of books for Carpenters, Builders, Architects, etc.

Caldwell Sash Balance

Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

CALDWELL MFG. CO.
5 Jones St., Rochester, N. Y.

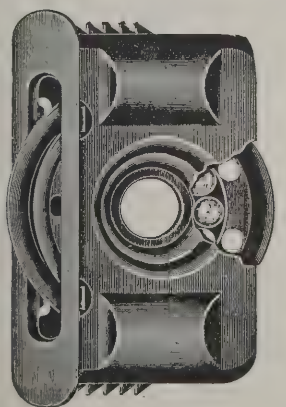
WHITE'S IMPROVED LEVEL

DAVID WHITE CO.

Shipped on Approval

Our No. 2011 improved level, illustrated herewith, is especially designed for work where a general purpose level is required. Telescope is 12" long with magnifying power 25 diameters and is capable of detecting an error of 1/16-inch in 300 ft. We ship this level out on approval, express prepaid, in order that you may try it out on your own work before deciding to keep it. Ask for particulars and catalogue illustrating Builder's Levels and Transits at a wide range of price. Ask today!

David White Co., Dept. B, 419 E. Water St., Milwaukee, Wis.



No. 10 Ball Bearing.

"Grand Rapids" All Steel Sash Pulleys

Fasten automatically. No nails. No screws. Just bore 4 holes.

The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

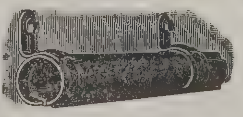
Write for free samples.

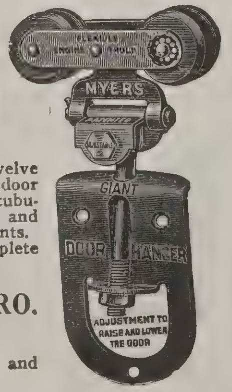
Grand Rapids Hardware Co., 160 Eleventh Street Grand Rapids, Mich.

THE MYERS GIANT DOOR HANGER

PATENTED

THE MYERS GIANT TUBULAR DOOR HANGER



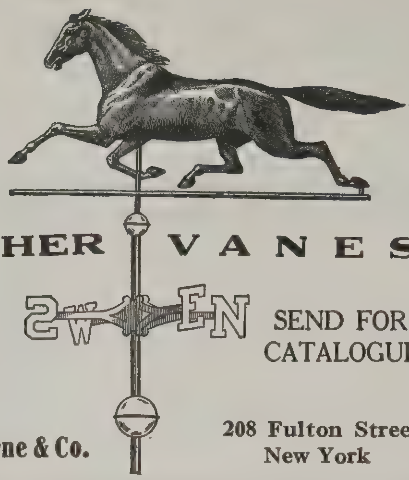

MYERS
GIANT
DOOR HANGER
ADJUSTMENT TO RAISE AND LOWER THE DOOR

This is one of twelve different styles of door hangers for flat or tubular track with lateral and perpendicular adjustments.

Write for our Complete Door Hanger Catalog.

F. E. MYERS & BRO.
ASHLAND, OHIO

The Ashland Pump and Hay Tool Works



WEATHER VANES

ALL SIZES
AND
DESIGNS

SEND FOR
CATALOGUE

E. G. Washburne & Co.

208 Fulton Street
New York

When a Wall Tie is a Wall Tie it is the Whalebone

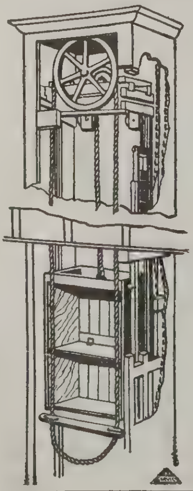
Made in any length from five inches to fifteen inches.
Standard size for Solid or Veneer walls 7 inches by ⅞ inches, weighing 50 pounds to the M. Packed 1000 to the box.
Price on standard size, based on 21 gauge material, $2.50 Pittsburgh per M. Shipments made same day order is received.
Can quote on lighter or heavier material if desired, as we can supply the Standard Whalebone in boxes weighing from 35 pound to M to 85 pound to M, according to thickness of material.

Allegheny Steel Band Co.
BELL PHONE: 718 Cedar North Side: PITTSBURGH, PA.

Something For You

in our Pamphlet 29; viz:
Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.
Some of these Tables are not in print elsewhere.
The Pamphlet and a Mounted Model Hanger will be mailed on request.
SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.



A B C
Dumbwaiter

Called this for its perfection and simplicity. There is none better made. It is built on honor, of the best materials, and is high grade, through and through. You can bank your reputation on it. A cheap dumbwaiter is dear at any price.

A special feature is our "Safety Check" to hold load at any floor. Let us tell you about it and quote prices.

Wm. F. King
21 Kingsland Ave., Brooklyn, N. Y.

metal weather strip made exclusively by the Diamond Metal Stamping Company, 624 Kerr street, Columbus, Ohio. The material of which the strip is made is high quality zinc of special spring bronze, thus preventing it from rusting and warping, and the claim is made that with ordinary usage it will last for years. Any reader of *The Building Age* who is interested in learning more about the weather strip can obtain a copy of the pamphlet by writing to the address given.

The Cement-Gun Construction Company

The Gun-Crete Company, of Chicago, Ill., makes announcement that it has purchased all the rights, titles, contracts and interests of the Cement-Gun Construction Company, and has also taken over the construction department of the General Cement-Gun Company. In future the combined business will be conducted under the style and title of Cement-Gun Construction Company, with offices at 914 South Michigan Avenue, Chicago, Ill. The officers of the new business are: President, Carl Webber; Secretary and Treasurer, John V. Schaefer, and Construction Manager, C. L. Dewey. In addition to doing all forms of cement-gun construction work, the company will also sell and lease complete cement-gun equipments.

TRADE NOTES

The poster calendar for October sent out by the National Mfg. Company, Sterling, Ill., illustrates the new 88 Adjustable Hanger with storm proof rail and is referred to as "the latest thing out in barn door equipment." The position of the door is changed merely by loosening the stay-nuts and operating the adjusting nut to bring the door the required hight. When the stay-nuts are tightened again the strain of weight is equally divided.

The H. H. Mayhew Company, Shelburne Falls, Mass., has been sending out an attractive catalogue of 80 pages illustrating and describing the special lines of tools which it manufactures. Prominent among these are screw drivers, nail sets, gimlets, reamers, bits, counter-sinks, punches, awls, etc.

Indicative of the merits of the batch mixer made by the Blystone Mfg. Company, Cambridge Springs, Pa., it is interesting to note that 50 of its concrete mixers were used in connection with the construction work of the Panama-Pacific International Exposition, which will open in February at San Francisco, Cal.

Levi H. Montross, president of the Montross Metal Shingle Company, Camden, N. J., died September 23, aged 72 years. He is said to have been the inventor of the metal shingle and the founder of the business which bears his name.

Stine Screw Holes Company, Decatur, Ill., is distributing a large poster calling attention to the merits of the brass screw holes which it manufactures and the merits of which are set forth at considerable length. There are testimonials from architects, dealers and mechanics regarding the satisfaction which these little devices have given in practical use, and there are also comments addressed to general contractors and construction companies as well as to manufacturers of plumbers' supplies. The point is made that the novelty and practicability of these screw holes appeal to every one who sees them and any reader of *The Building Age* interested can secure a mounted sample on application.

George P. Blackiston, advertising manager of the Berger Mfg. Company, Canton, Ohio, and of other companies in that city, has been appointed publicity manager of the Canton Chamber of Commerce and in addition to his present duties will assist in promoting various campaigns of the chamber, including one to secure the location of more industries in Canton.

The Safety Door Hanger Company, Ashland, Ohio, calls attention of architects and builders to the fact that "Red Rib" hangers are of the tandem type, are flexible, strong, shed water, are bird-proof, noiseless and are fitted with roller bearing wheels. The frames

(*Continued on page* 88)

Applied by Joe Thorp
Contractor

Why Not Use Wall-Board?

That's the suggestion you carpenters and contractors want to make to your customers. But be sure you specify

PLASTERGON
TREATED WOOD FIBRE
WALL-BOARD

"Every panel guaranteed"

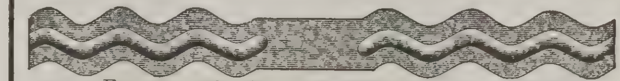
The protection we give the wood fibre by our chemical treatment insures dependability and protects you in the recommendation and use of it.

Send your name to our Service Department for full information and samples to give your trade.

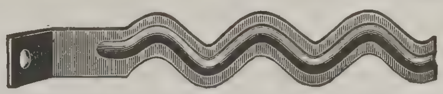
PLASTERGON WALL BOARD CO.,
102 Fillmore Ave, Tonawanda, N. Y.

BERGER'S
RIB-TRUS
Reinforcing and Furring Plates
WRITE FOR CATALOG
The BERGER MFG. Co., CANTON, O.
FOR THE BEST SERVICE ADDRESS NEAREST BRANCH
NEW YORK BOSTON CHICAGO MINNEAPOLIS
ST. LOUIS SAN FRANCISCO PHILADELPHIA

NIAGARA GALVANIZED WALL AND VENEER TIES



For strengthening and stiffening brick walls



For attaching brick to frame in brick veneered buildings

Good Metal Ties are the Stiff Backbone of any Wall
There are no Ties better than the Niagara

Samples on request. Ask for folder 57 A

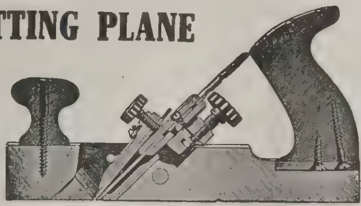
NIAGARA FALLS METAL STAMPING WORKS
Manufacturers of Hardware Specialties
Niagara Falls, N. Y., U. S. A.

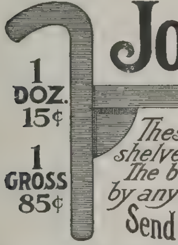
Wall Plugs **Sash Chain** **Sash Fixtures** **Sash Pulleys**
S-37

ONLY SELF-SETTING PLANE

Sent on trial as per circular. Our $1.00 certificate if you mention this paper.

GAGE TOOL CO.
Vineland, N. J.



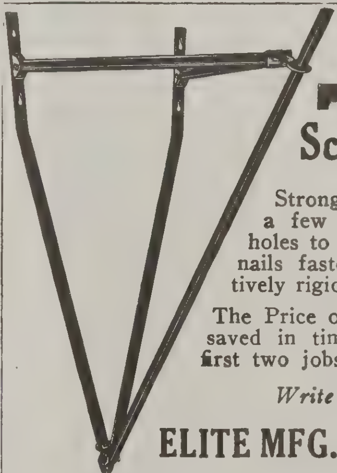


1 DOZ. 15¢
1 GROSS 85¢

JOHNSTON'S *Patent* SHELF PIN

These Pins are used for supporting movable shelves in Book Cases. Cannot fall out or sag down. The best shelf pin made. Easily put in place by any one

Send for free sample to **J. D. JOHNSTON,**
NEWPORT, R. I.



RELIABLE
FOLDING
Scaffold Bracket

Strong and safe; requires only a few minutes to attach. No holes to bore. Four 10-d or 16-d nails fasten them securely. Positively rigid; no vibration.

The Price of these Brackets can be saved in time and material on the first two jobs.

Write for Circular C.

ELITE MFG. CO., Ashland, O.

1853
BUCK
BROS.
1914

BUCK BROS

Buck Brothers' Tools are LASTING tools—they keep their edge.

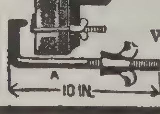
We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

BUCK BROS., Millbury, Mass.

$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)

ABSOLUTELY SAFE for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.

Write for Catalogue of Builders' Specialties



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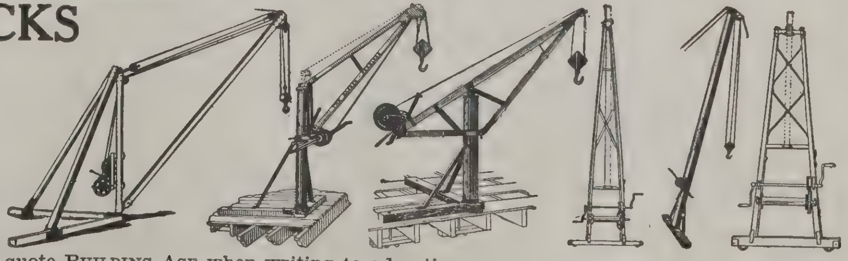

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The card calendar for October sent out by the Richards-Wilcox Mfg. Co., Aurora, Ill., bears the suggestive title "Everybody likes them." Of course, this means the "R-W" hangers, but on the card above the calendar proper is a picture of the charming young lady who poses for this series of calendars and she has in her hands three luscious looking apples, from one of which a generous bite has been taken. The expression "Everybody likes them," therefore, is significant in its double meaning.

Moses Berman, architect and engineer, with offices at 702 Willoughby avenue, Brooklyn, N. Y., desires to receive copies of manufacturers' catalogues and samples.

Cassens Mfg. Company, Edwardsville, Ill., calls attention in a 16-page pamphlet to the merits of Cassens Ideal eaves trough, conductor pipe and sheet metal goods which it manufactures. The construction of the eaves trough is such that it cannot fill up with rubbish of any kind and it does not in any way interfere with the roof. The body of the Ideal is nailed to the cornice and then the cover is put on. The lid is made in 5 ft. sections. The claim is made that it can easily be removed at any time to paint the inside of the trough.

The striking feature of the fall series of *Varnish Talks*, issued by Pratt & Lambert, 102 Tonawanda Street, Buffalo, N. Y., is a double page group of photographic views of some well-known hospitals in which the company's materials have been used. The second portion of a three-part article entitled "The Business of Painting" and dealing with the cost of doing business has the leading place. Another article deals with the comparative cost of labor and materials, while a series of Shop Rules adopted by the Master Painters and Decorators' Association of Boston, Mass., are an interesting feature of the contents.

Kenneth J. Grant, general Southwestern representative of the L. S. Starrett Company, Athol, Mass., mechanical tools, who has just concluded a 45-day trip through Illinois, Missouri, Oklahoma, Alabama, Texas, Louisiana and other States, reports a slight improvement in business throughout the territory after a bad slump three to four months ago.

The Yale & Towne Mfg. Company has secured a new sales location in Chicago, Ill., at 77 East Lake street, which it will occupy for a term of years. The Chicago office of the company is now at 74 East Randolph street.

The Standard Mfg. Company, Shelby, Ohio, makers of the "Standard" checking floor hinge, has just moved into its new factory on Franklin avenue, which was constructed by the DeVore-Gormley Company, Toledo, Ohio. We understand that the new facilities were necessary in order to meet the increasing business of the company, much of which is said to be due to the introduction of the new checking floor hinge which has developed a most gratifying popularity with architects and builders. Large orders have recently been received for these hinges for hospitals, schools and other public buildings in all parts of the country and Canada.

A New-Process Tile for building construction and glazed without the use of lead is being placed on the market by the Clifton Porcelain Tile Company, 51 Clifton Street, Newark, N. J. It is the invention of Charles Stegmayer, and strong claims are made for it.

An automatic temperature regulator is the subject of an attractively printed catalogue which is being sent out by the Johnson Service Company, Milwaukee, Wis. The system consists of automatic devices regulating the temperature of air, water and other heating and cooling mediums. While especially adapted to regulating the temperature of schools, office buildings and residences, it is equally useful in connection with manufacturing processes where uniformity of temperature is an important factor in quality and economy.

Walter B. Snow, publicity manager and advertising agent, has removed his offices to the new Federal Street building at 136 Federal street, Boston, Mass.

THE BUILDING AGE

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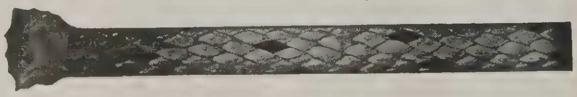

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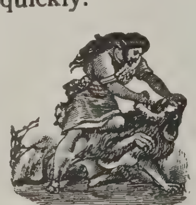

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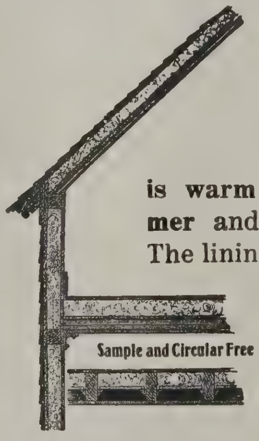

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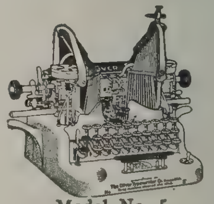

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LIFE GUARANTEE.

General Manager, **Typewriters Distributing Syndicate**

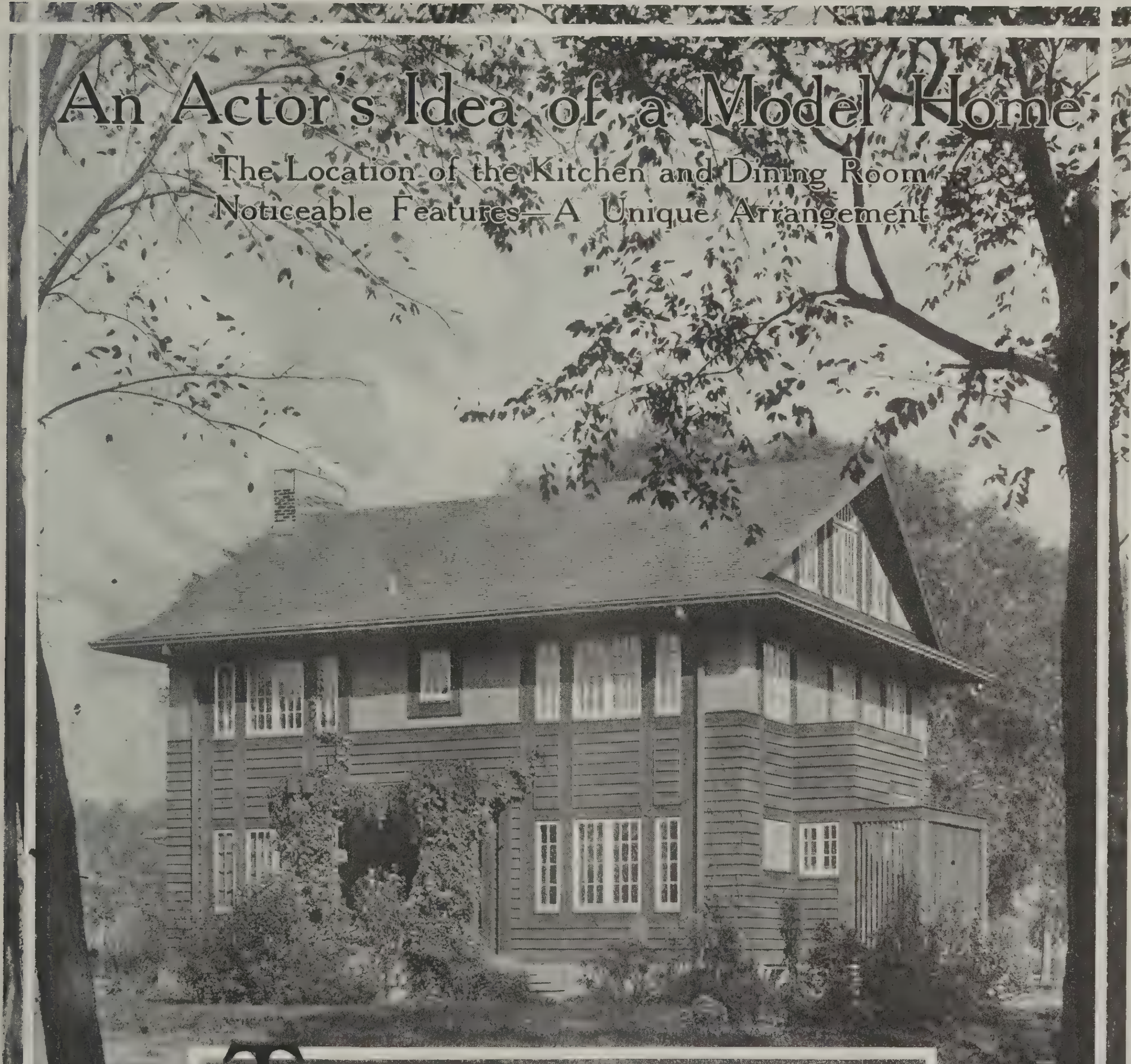
166-Y20 North Michigan Boulevard, Chicago, Ill. (232)

THE BUILDING AGE

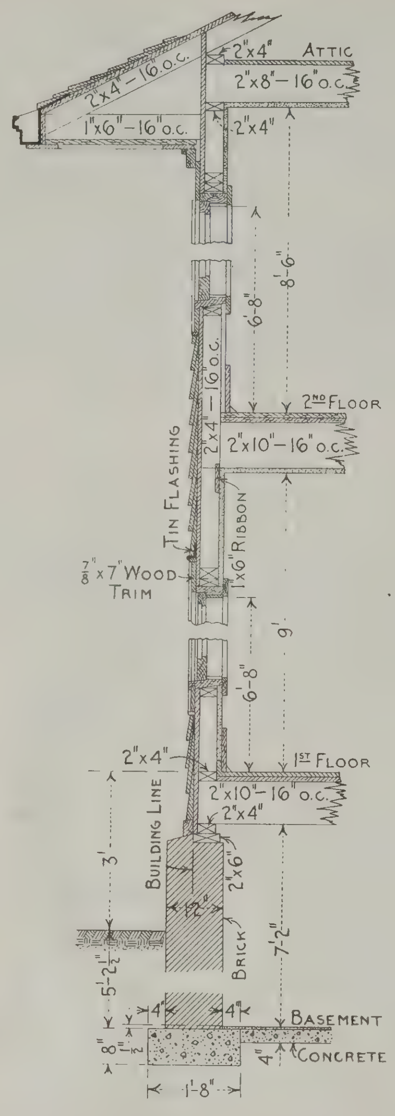
NEW YORK, DECEMBER, 1914

An Actor's Idea of a Model Home

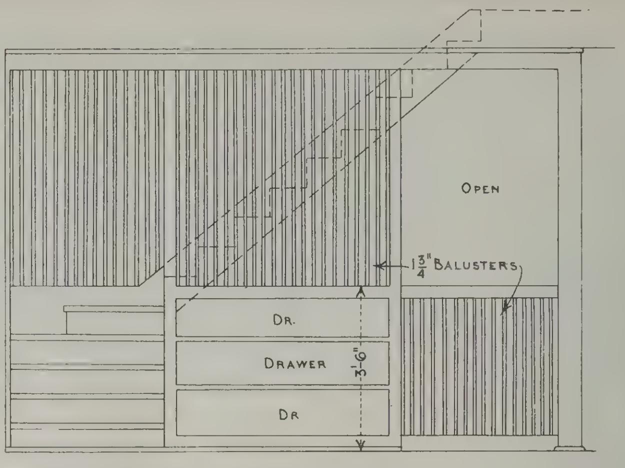
The Location of the Kitchen and Dining Room Noticeable Features—A Unique Arrangement



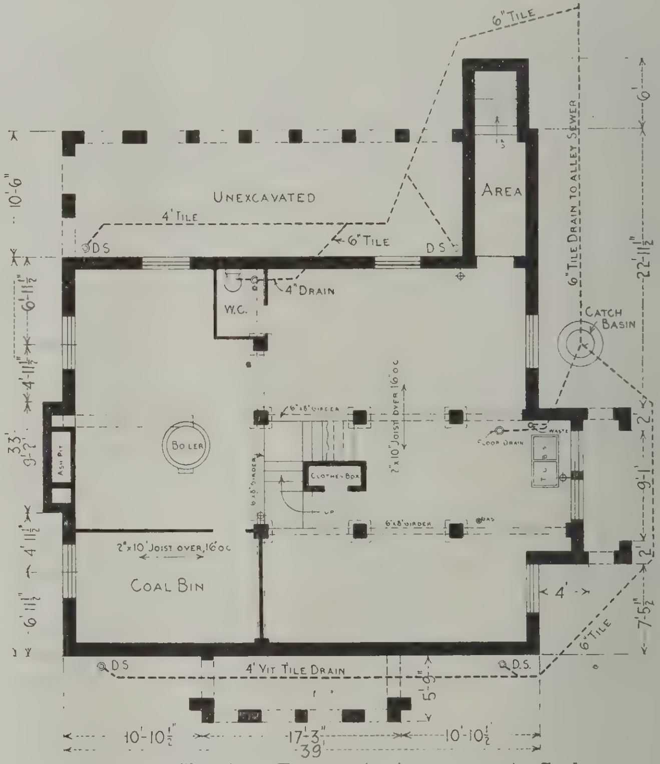
THE suburban cottage which forms the basis of the present article embodies a number of especially pleasing and attractive features, both interior and exterior, and illustrates to some extent an actor's idea of a model dwelling house. It is situated in River Forest, Ill., one of Chicago's many pretty suburbs, and is owned by a member of the Middle Western theatrical profession. The architectural features have been supplemented by the carrying out of harmonious color schemes both inside and out, and the general arrangement of the floors is such



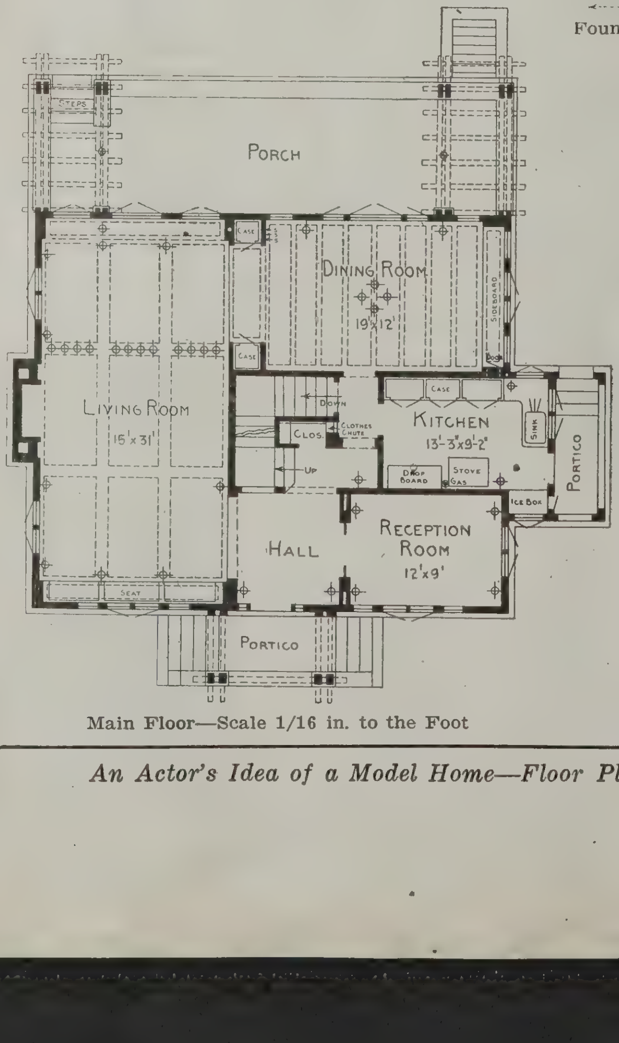
Vertical Section Through the Main Wall Showing Details of Construction. —Scale 3/8 in. to the Foot



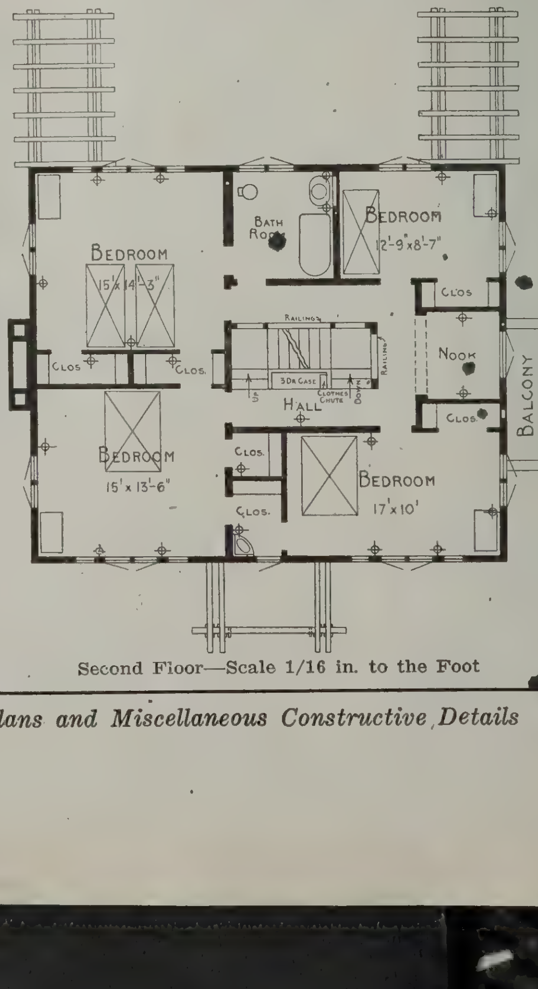
Detail of the Second Floor Stair Hall—Scale 3/8 in. to the Foot



Foundation Showing Basement Arrangement—Scale 1/16 in. to the Foot



Main Floor—Scale 1/16 in. to the Foot



Second Floor—Scale 1/16 in. to the Foot

An Actor's Idea of a Model Home—Floor Plans and Miscellaneous Constructive Details as to command attention. The position of the kitchen, dining room and reception room is especially noticeable by reason of the convenience resulting and the facility with which the front door may be reached from the kitchen, dining room or living room without the necessity of passing through any other apartment.

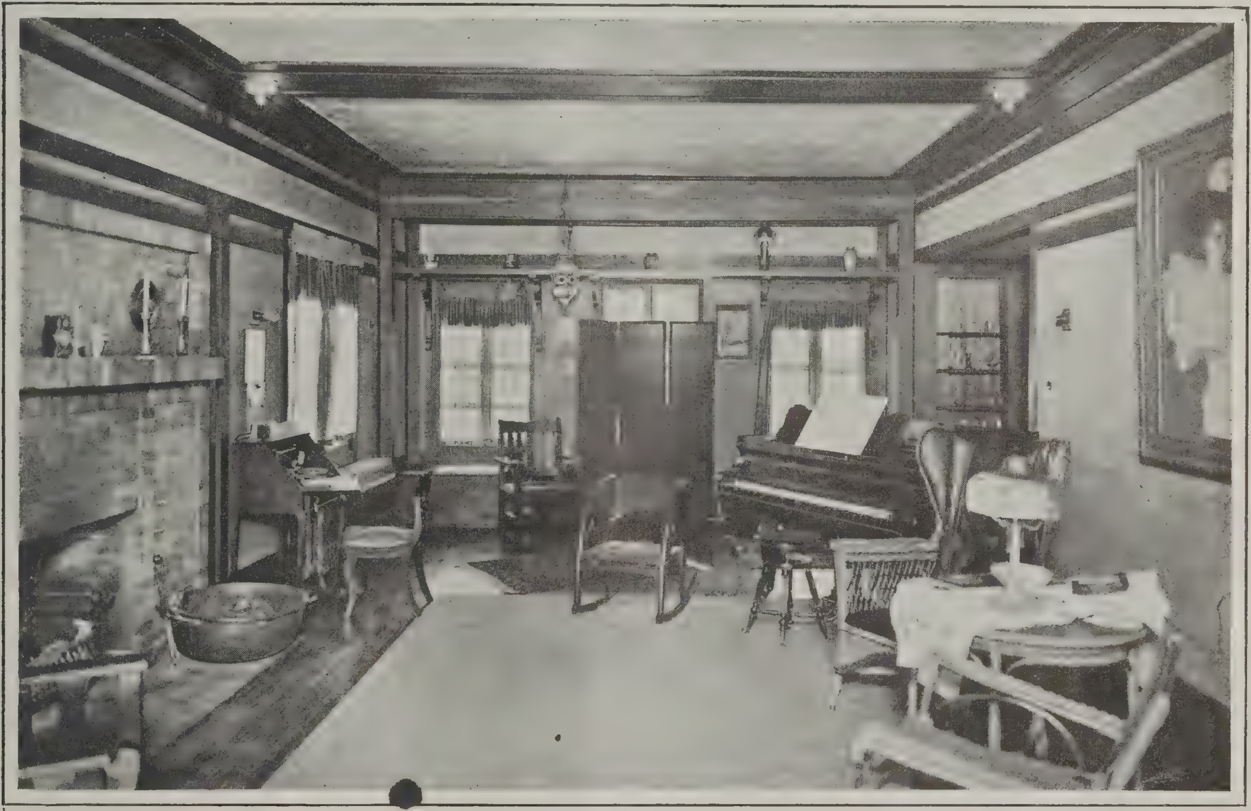
The building has a southern exposure and entrance is possible from this as well as from the east side, the entrance in each case having an attractive portico. The east doorway gives immediate access to the kitchen, while at the rear or north side is a large open porch or terrace with extending beams above for the pergola effect to be seen in the exterior views accompanying this article. The picturesque effects of overhanging vines on this and the front portico add greatly to both perspectives. The exterior woodwork has panels of white pine, stained green, with the surrounding siding stained a dark brown. All window frames are painted white, while the chimney stack on the west end is composed of green brick in its exposed surfaces and is capped with concrete.

It will be seen from the various pictures which were taken especially for *The Building Age* that excellent provision for natural lighting has been included in the plans, this feature being particularly noticeable in the living room. In this connection it may be stated that the living room is a few inches below the level of the remaining first floor rooms, and has dimensions of 15 x 30 ft. In the center of its west wall a large open fireplace with a smooth Roman brick mantel and hearth has been built. Seats with hinged tops have been placed to advantage at the north and south ends of the room and communication between this and the dining room as well as the porch is possible through French windows, so popular in many sections.

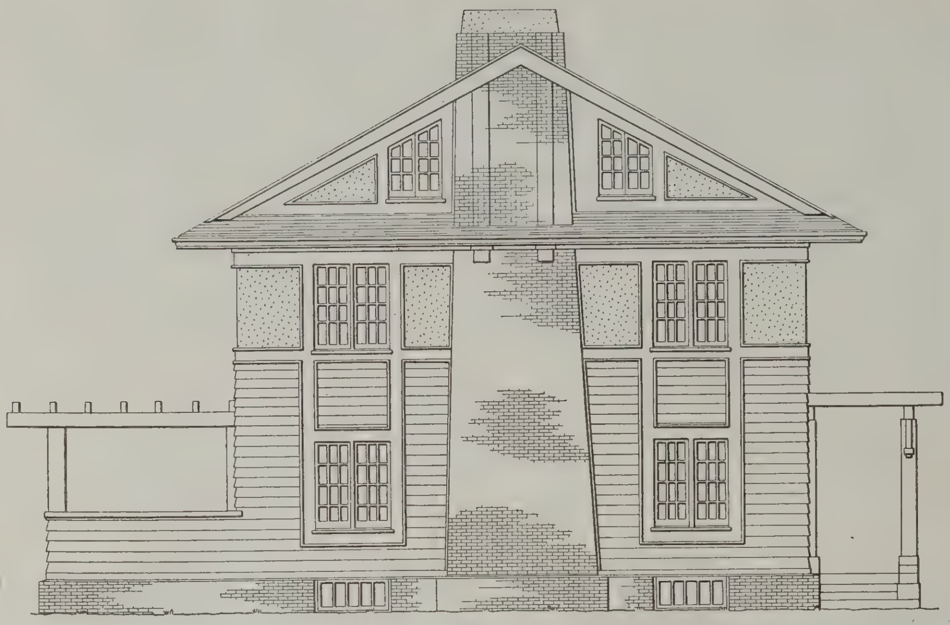
The dining room measures 12 x 19 ft. and is in part separated from the living room by cases for books and ornaments which have been built in the space between these rooms, as shown in the pictures and in the details of construction reproduced herewith. A large sideboard and china closet is situated at the far end of the dining room. The kitchen and reception room complete the first floor plans, the former being equipped with a large case replete with numerous bins and cupboards, details of which are also shown in the accompanying drawings all drawn to scale.

The second floor has four large bedrooms and a bath room, with a nook off the hallway leading to a small balcony immediately above the portico on the east side. The three larger bedrooms communicate and each has a spacious clothes closet. A large case is provided on the landing and one of its sections contains a clothes chute which leads to the basement. Clothes may be dropped from the first floor through a door in the chute in the hallway. A clothes closet for visitors is located in the main hall on the first floor close to the reception room. In the attic are a bath room and a spare bedroom.

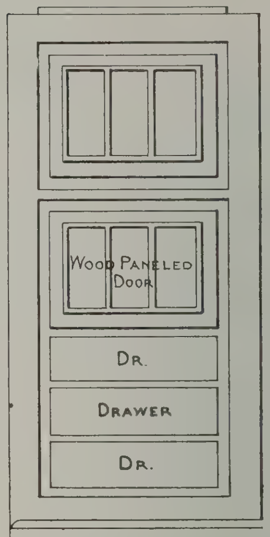
The specifications called for foundations of concrete, the mixture being composed of one part of best grade Portland cement, two parts of sharp torpedo sand and four parts of limestone screenings small enough to pass through a 1½-in. ring. The basement piers are 12 in. square and extend under the wood girder having 2 ft. sq. footings 1 ft. high, of concrete. The basement floor is of concrete, 3 in. thick, resting on a bed of cinders 4 in. deep. The final coating or wearing surface is ½ in. thick, composed of one part of Portland cement and two parts of coarse sand, carefully floated



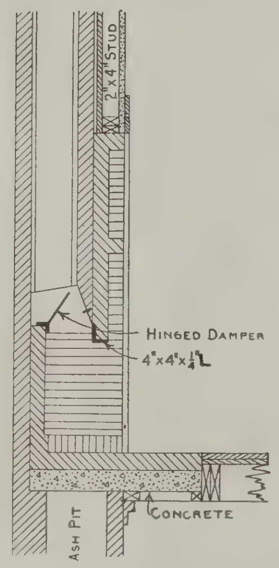
An Actor's Idea of a Model Home—View in Living Room Looking Toward the Rear Porch



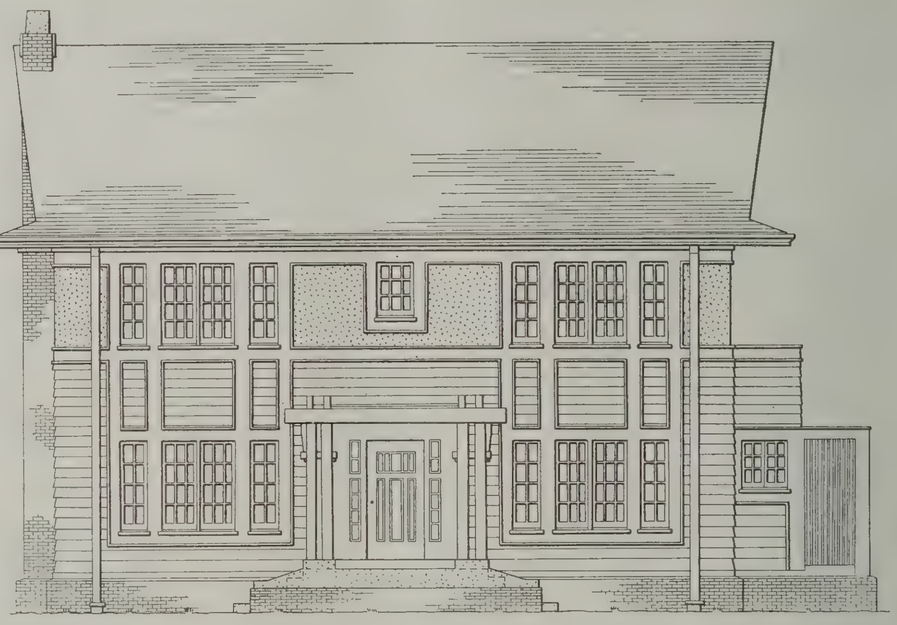
Left Side or West Elevation Showing the Outside Chimney of Brick—Scale 3/32 In. to the Foot



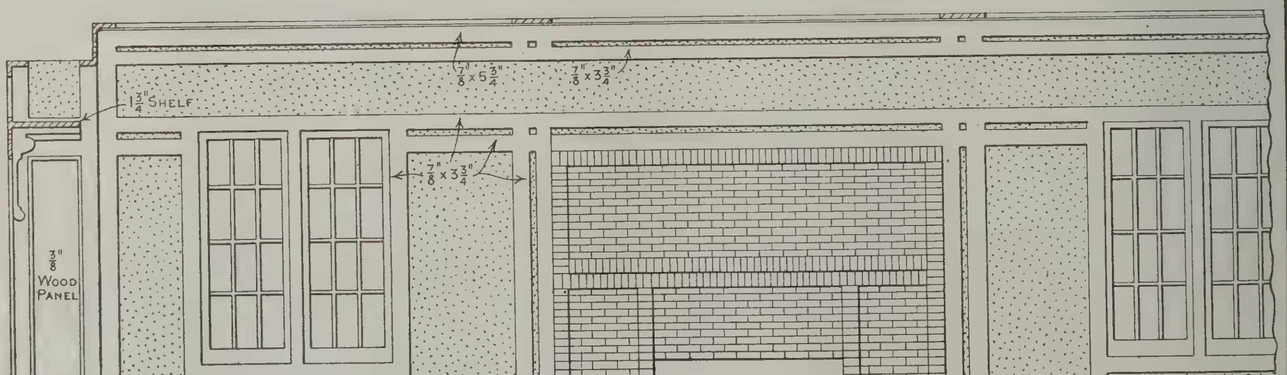
Elevation of Case Between Living and Dining Rooms — Scale ⅜ in. to the Foot



Vertical Section Through Living Room Fireplace —Scale ⅜ in. to the Foot



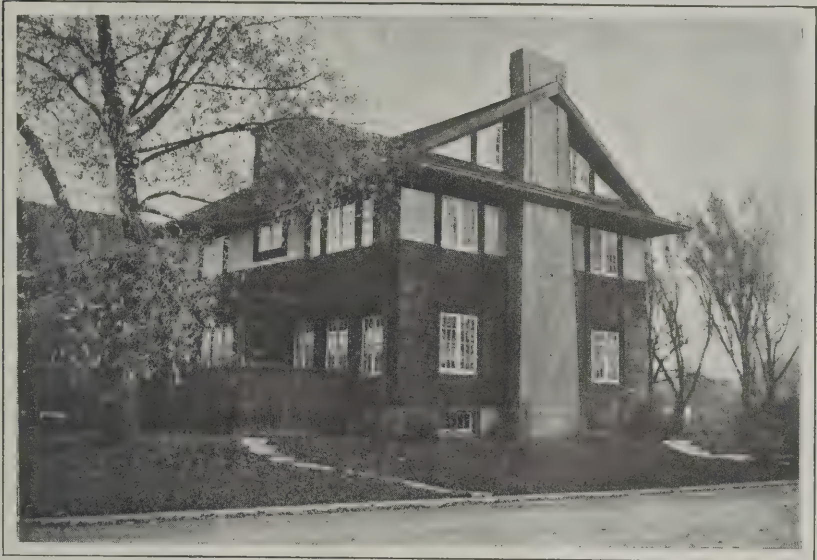
Front or South Elevation—Scale 3/32 in. to the Foot



Partial Elevation of the Chimney Side of the Living Room Showing Brick Fireplace and Mantel—Scale ¼ in. to the Foot

An Actor's Idea of a Model Home—Elevations and Miscellaneous Constructive Details and troweled so as to give a uniform surface.

The framing lumber throughout is of No. 1 yellow pine, and all exterior walls and roofs are sheathed of the same material, ship-lapped 1 x 8 in. The rough flooring measured 1 x 6 in. The sheathing boards of the house are covered with one layer of black Neponset building paper, made by Bird & Son, East Walpole, Mass., well lapped and doubled around the window frames. Between the rough and finish floors is a single layer of good quality red rosin size paper. All outside studs are 2 x 4 in. placed 16 in. on centers; all headers and trimmers being well spiked, with tail joists and headers resting on 2 x 4-in. strips. All stud partitions are of No. 1 yellow pine, the studs being 2 x 4 in. placed 16 in. on centers and doubled at all openings. The heads of all openings are well bridged and braced. All bearing partitions built on top of the girder below have double ceiling plates, while all others have 2 x 4-in. sills and single ceiling plates.



An Actor's Idea of a Model Home—The Chimney End of the House, Showing Also the Rear—The Multiplicity of Windows is Here Strikingly Apparent

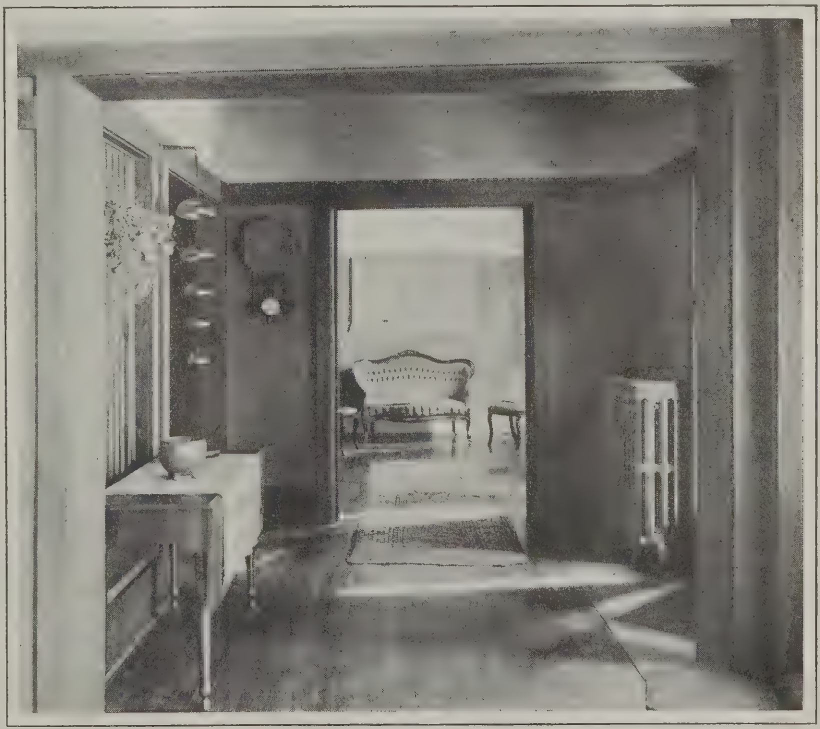
All chimney flues have their entire length lined with fire clay tile laid in Portland cement mortar. The cap is of concrete, the mixture being one part of Portland cement and three parts of sharp torpedo sand. The shingles for the entire roof are of the double Star "A" cedar brand laid 4½ in. to the weather, dipped in creosote stain.

Where casement door frames are indicated they are "B" grade white pine, 1¾ in. thick, rabbeted for 1¾ in. sash, and made according to special detail. All frames are rabbeted 1 in. for ½ in. hardwood lining. All sashes on the exterior are 1¾ in. thick. The floors for porches and porticos are made up of 1⅛ x 3¼ in. boards laid with 1/16 in. open joint. Risers are of ⅞ in. lumber and treads for stairs 2 x 4 in., all of clear white pine.

All finish floors, with the exception of the kitchen and bath room, are of ⅞ x 2¼ in. face selected plain sawed red oak, and attic floors are of common oak. The bath room and kitchen floors are of 1 x 6 in. matched white pine.

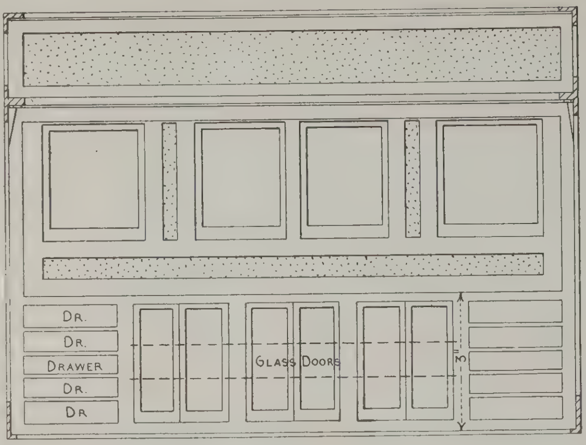
All interior trim is of birch. Cases were made according to detailed drawings having wood lining and shelving as used for outside trim. All doors for cases are 1⅛ in. thick, and all drawers have the sides dovetailed into ⅞-in. fronts. All cases, except where otherwise shown, are back lined with ⅜-in. matched and beaded stuff with ⅞-in. fronts, and where glass is shown it is set with wooden stops. All closets are provided with ⅞ x 3¾ in. hook strip and two 16-in. wide shelves. The doors throughout the first and second floors inside are 1¾ in. thick, single paneled white pine. Outside kitchen and exterior and interior basement doors are also 1¾ in. thick, all provided with plain molded ½ x 1¾ in. stops. Thresholds are of plain sawed oak. The front door is 2¼ in. thick, of three-ply veneer and made according to special details.

The stairs are of red oak with 1⅜ in. solid treads with ⅞ in. risers, housed, wedged and glued into 1⅛ in. stringers. The hardware throughout is of dull bronze and in harmony with the finish.

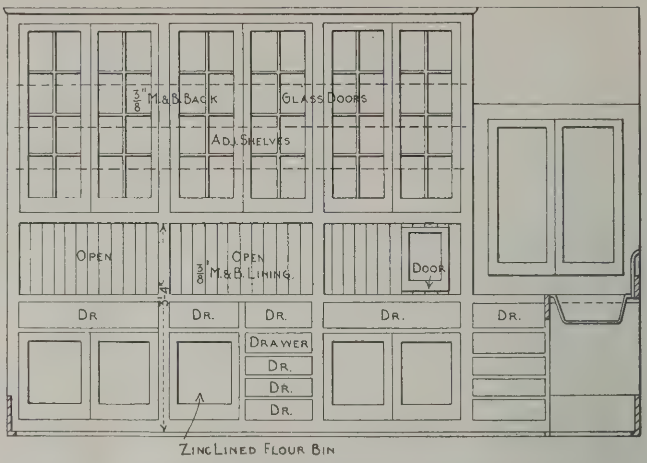


Looking from the Living Room Into the Reception Room Across the Main Hall

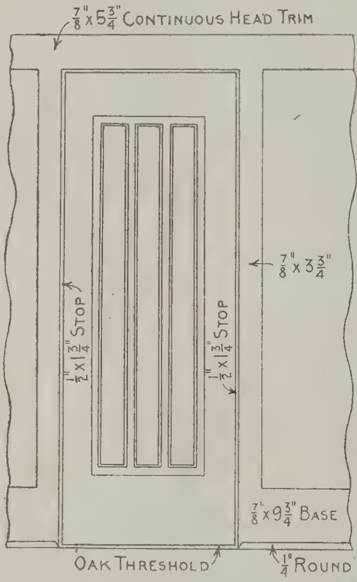
The wood lath used is 1 in. wide of No. 1 white pine. The first coat of all mortar and finish coat for all plaster work was made in the proportion of one barrel of pure lime, thoroughly slacked, and



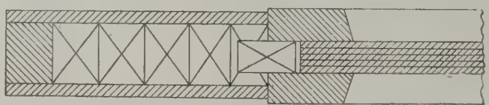
The Sideboard End of the Dining Room—Scale ¼ in. to the Foot



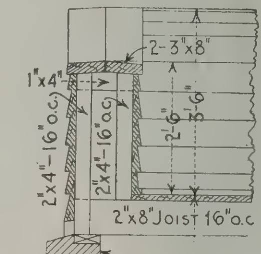
Details of Kitchen Case with Section Through the Sink—Scale ¼ in. to the Foot



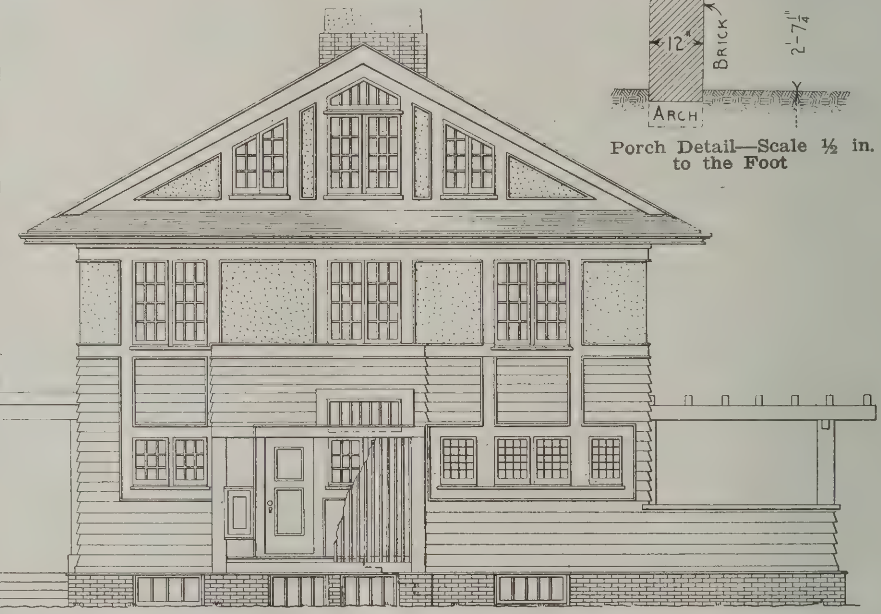
Detail of Typical Door and Trim Except Where Otherwise Shown—Scale ½ in. to the Foot



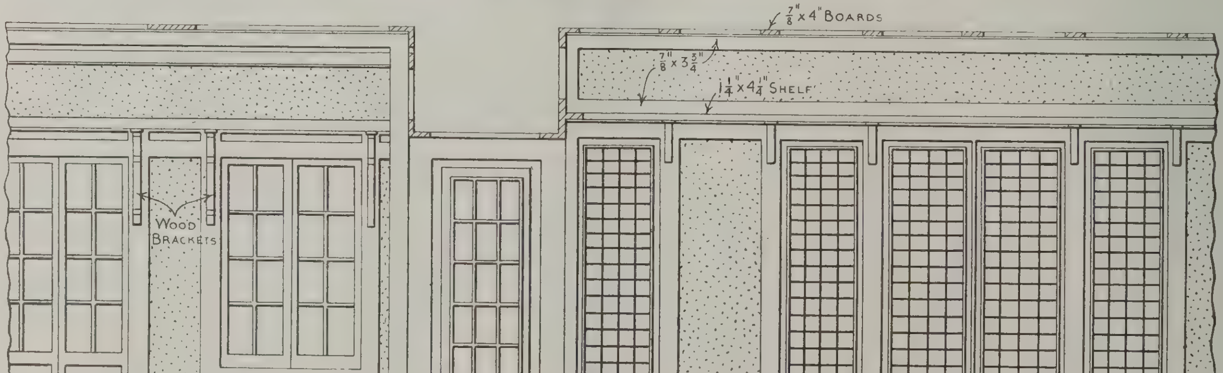
Horizontal Section of Typical Door—Scale 3/16 in. to the Foot



Porch Detail—Scale ½ in. to the Foot



Right Side or East Elevation Showing Entrance to Kitchen—Scale 3/32 in. to the Foot



Partial Elevation of Side of Living Room and Dining Room Looking Toward the Rear—Scale ¼ in. to the Foot

An Actor's Idea of a Model Home—Miscellaneous Details of Construction strained, to three barrels of clear, sharp sand, to which was added one-half bushel of hair. On this was applied a coat of hard finish, excepting in the kitchen and bath room, composed of lime, putty, white sand or marble dust, and plaster of Paris. The kitchen has a 5 ft. cement plaster wainscoat. The inside plaster work is two coat and exterior three coat work, the latter having enough Portland cement added to make a firm and hard setting.

The painting throughout is of three coat work. All lead used is that of the National Lead Company and the raw and boiled linseed oil of Hanaford & Hall's manufacture.

All ridges, valleys and chimneys are flashed with No. 26 gauge galvanized iron, the 4 x 6 in. downspouts being of corrugated iron. Outside sheet metal work was given three coats of lead and oil. All trim in the kitchen is finished with one coat of filler and two coats of Pratt & Lambert's No. 38 preservative. The trim in the bath room is of "Ripolin" white enamel.

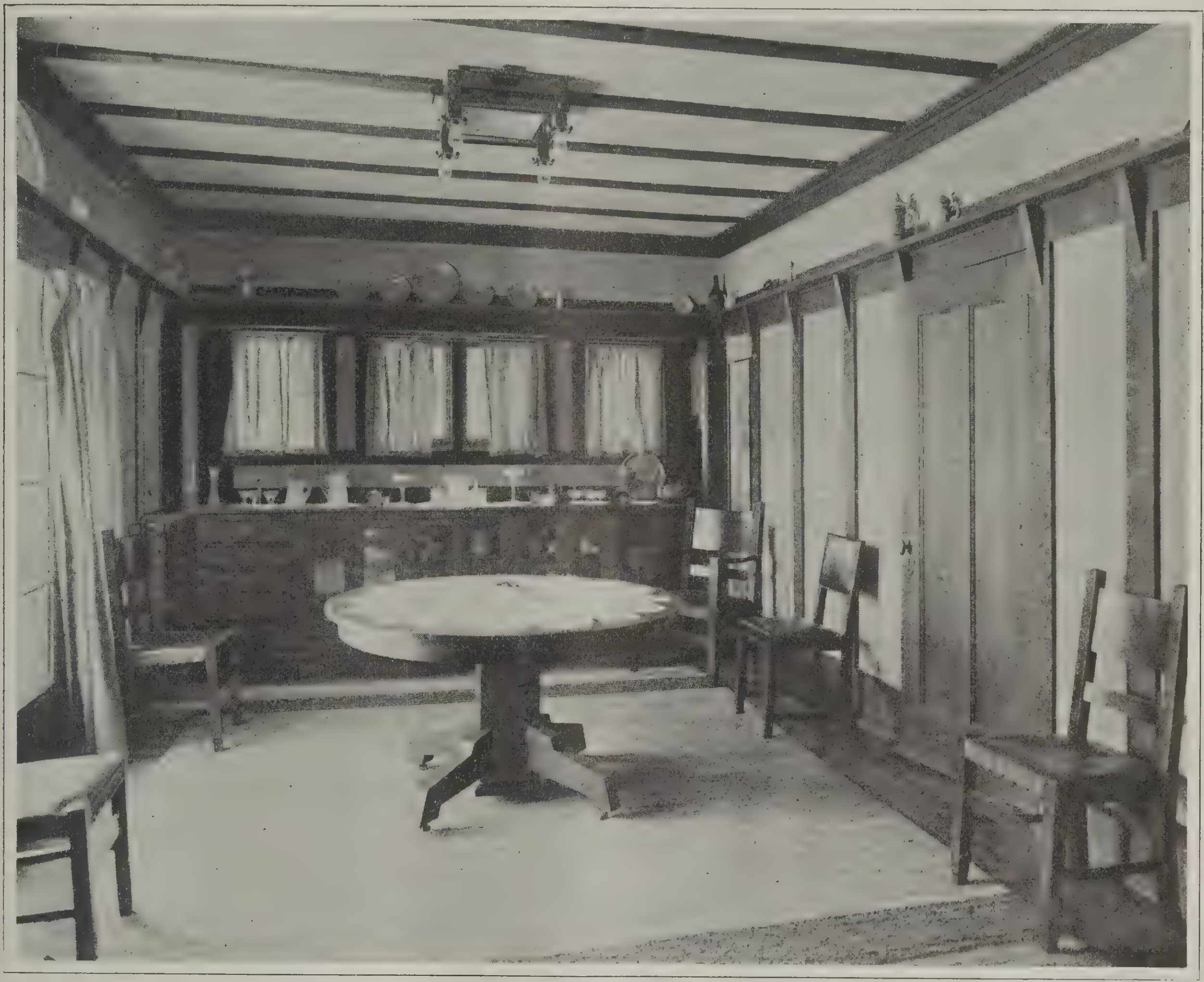
The kitchen is provided with a 22 x 36 in. enameled iron sink set on a concealed wall hanger. The bath room has standard fixtures, all of a type made by the Wolff Manufacturing Company, Chicago, Ill. Set in the basement with the proper connection is an 85-gal. galvanized iron hot water tank for supplying hot water to all faucets.

The building is piped for gas and wired for electric lighting.

The house is heated by a Victor hot water boiler No. 255, manufactured by the Thatcher Furnace Company, New York City. Where radiators are used beneath windows they are of the low type, otherwise the standard size is maintained throughout the house.

The residence here described was built for Elias V. Day, of Quick avenue and Bonny Brae, River Forest, Ill., from plans prepared by Architects Tallmadge & Watson, 1004 Security Building, Chicago, Ill., under whose personal supervision the construction was carried out.

The cost was about $6,000, but this figure would vary somewhat with locality and style of finish.



An Actor's Idea of a Model Home—The Dining Room Looking Toward the Sideboard

◆

The Mediæval House Builder

During the twelfth and first half of the thirteenth century the houses of the great mass of people were little better than hovels, the walls consisting for the most part of timber framings filled in with mud and straw. The houses were low, being only one story in hight and covered with a thatched roof. Closely packed together as were these houses and without chimneys, splendid material was provided for a fire, says E. E. Brockwell in a paper read before the British Institute of Certified Carpenters. Consequently, we find that probably the first attempt at forming building regulations was due to a conflagration. These advocated the building of party walls 3 ft. thick and 16 ft. high. Compliance was voluntary, owing possibly to the fact that these recommendations were drawn up at an Assize of the Citizens of London, who did not feel enthusiastic about a matter that would have put them to expense. One clause was to the effect that if a man wishes to build such a wall, and his neighbor would or could not assist in the building, the dissentient had to supply the whole of the land, but had the right to support his timbers upon the said wall. Very little voluntary action accrued, however, so that after another large fire in 1212 the citizens again assembled and passed stringent compulsory regulations for the safety and convenience of the inhabitants. Many clauses were framed dealing with party walls and recesses therein.

The draining of the roof received a good share of attention. Provision had to be made for the effective removal of rainwater in such a manner that a neighbor's property was not rendered liable to suffer any injury. Tiled roofs were advocated, but were not compulsory. Rush and reed coverings in an exposed state were condemned, and all such coverings were to be plastered within eight days. The penalty for non-compliance was the demolition of the house.

A rather amusing clause, and one that throws a good deal of light upon the functions of the aldermen at that period, was that aldermen were to carry a cord with a hook attached, and were invested with the power to pull down by its aid any house attacked by, or liable to attack during, a conflagration. This also helps one to form an estimate as to the character of the houses, and one can only conclude that they must have been of a rather crude form of construction.

At this Assize the rate of pay for the ensuing year for carpenters, masons and tilers was also fixed. The amount was the same for each trade. It was 3d. per day with keep or 4¼d. per day without keep. According to Professor Thorold Rogers, who is considered an authority on such matters, the present value of thirteenth-century prices can be obtained approximately correct by using a multiplier of from 13-14. The amounts mentioned would be equal, therefore, to 3s. 9d. and 4s. 7½d. respectively.

Great advances had been made in the various building trades by this time. Specialization had become a force dividing up industry in all directions. Masons were divided into two classes at least, namely, cutters and sculptors of freestone and layers and setters. Bricklayers, or men called such, were not known; but as there was in use at this period a small kind of brick, imported probably from Flanders, and as records of buildings which included bricks in their structure contain references to tilers, there is no doubt that the bricklaying was executed by these men.

Plasterers are mentioned; also mudstickers, who filled in the framework of houses. In the less skilful division are such distinctions as barrowmen, laborers and excavators.

The joiner is not mentioned, perhaps he had not put in his appearance. When he did, there arose several occasions when the members of each craft indulged in a resort to physical force to settle points of etiquette concerning their crafts.

It was about the year 1230 that joinery work came into vogue in England, and, of course, the King's establishments were the first to be improved. The royal bailiffs and master carpenters in the King's service must have had a very trying time, judging by the records still existent. Scattered about the country were about thirty royal residences, each of which had to be brought up-to-date. Besides these, the King seems to have exercised in a thorough manner his royal privileges by ordering alterations and improvements wherever he was likely to stay or stayed during a journey.

◆

Coming Convention of National Builders' Supply Association

The annual meeting of the National Builders' Supply Association will be held in Chicago, Ill., February 8 and 9, 1915, with headquarters at the Hotel Sherman. This will just precede the Cement Show which is to be held in the Coliseum, February 10 to 17.

◆

A Day School for Apprentices

A movement has been inaugurated by the Sheet Metal Contractors of the city of Philadelphia looking to a more thorough and practical industrial education for the apprentice. Beginning on September 21 the Philadelphia Trade School began day instruction for a class of about 40 sheet metal apprentices, all of whom have the privilege of attending school one full day in a week from 9 a.m. until 3 p.m. and the remainder of that day for study. The class is divided into five sections; that is, one for each school day of the week and the employer and the apprentice select the day the apprentice will attend the school. The course of study is that outlined by the educational committee of the National Association.

◆

Convention of New York Forestry Association

The State Forestry Association, organized at Syracuse in January, 1913, has made rapid growth during the two years of its existence and now has over 500 members from every section of the State and from many states outside of New York. It will hold its third annual meeting in Convention Hall in Rochester in January, 1915, and it is expected to have leading foresters and naturalists from all parts of the country on its program. The evening meeting will be given up to addresses and moving pictures, showing woods operations, activities of forest schools and the life of the forester.

◆

John D. Corlett, president of the Chicago Builders & Traders Exchange, is at present enjoying a two months' sojourn in Napa, Cal. The recent death of Mr. Corlett's wife was a sad blow to him, and it is expected that a recuperation in the sunny climes of the Pacific Coast will enable him to officiate at the Exchange with his usual enthusiasm in the near future.

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

ASSUME any number of equal loads equally spaced as in Fig. 28. This amounts to a uniform load and triangles being drawn as shown, for each load, a bending moment diagram is formed of which the boundary is a parabola. Knowing this to be true a parabola with a height represented by

$$M = \frac{wL^2}{8} = \frac{WL}{8}$$

is drawn to represent the bending moment for uniformly loaded beams. The bending moment at any point is obtained by measuring vertically from the center line of the beam to the parabola. The bending moment at any point of a uniformly loaded beam is computed as follows, calling the distance from the end of the beam to the point in question x:

$$M_x = \frac{wlx}{2} - \frac{wx^2}{2}$$

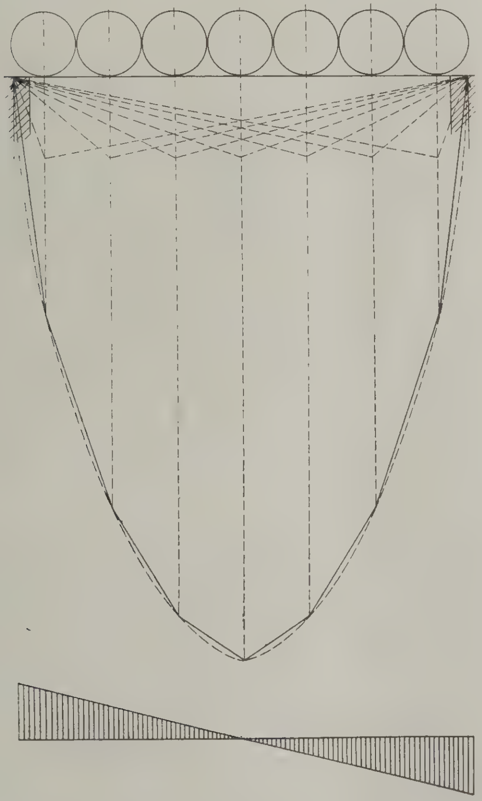


Fig. 28—Graphical Method for Uniformly Distributed Load on a Beam

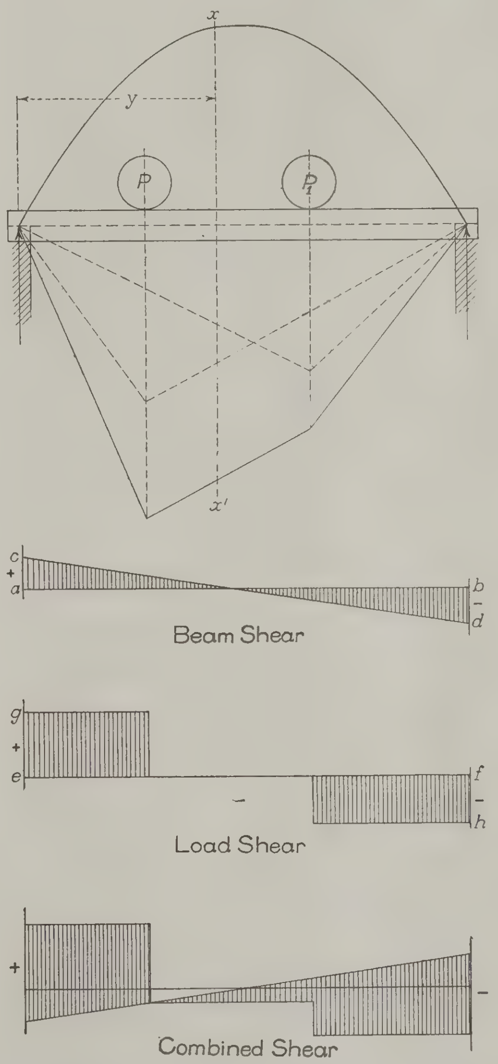


Fig. 29—Graphical Method for Combination of Concentrated Loads and Uniformly Distributed Load on a Beam

Design of Beams, Girders and Trusses

A moving load, for example, a wheel, occupies each point on the beam as it travels. If a triangle is drawn for each position of the load and the ends of the triangles connected by a bounding line a parabola will be formed, for the moment under each point is due to the single load and there are no intercepts caused by other loads. Consequently, to ascertain the bending moment at each point on a beam due to a single traveling load construct a parabola with a middle height represented by

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Note—In this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 39 of the November issue.

$$M = \frac{PL}{4}$$

In Fig. 29 is shown the effect of concentrated loads plus the uniform load due to the weight of the beam. The moment due to the uniform weight of the beam is computed and a center line measured upward to represent this moment. Construct a parabola.

Below the center line of the beam construct a bending moment diagram representing the effects of the concentrated loads. The bending moment at any point is shown by the line intercepted by the upper and lower boundaries of the bending moment diagrams. For example, at a distance y from the left end of the beam the bending moment is shown by the length of the line x-x_1.

Under each bending moment diagram the shear diagram is shown. In Fig. 29 draw the reactions to scale so that a-c and b-d each represent one-half the weight of the beam. Connect c to d and the two resulting triangles represent the shear to scale at each point on the beam. The horizontal measurements represent lengths and the vertical measurements represent weights. The shear changes sign at the point of maximum bending moment. For a uniformly loaded beam this is in the middle of the span. For concentrated loads the maximum moment is under the heaviest load and this is practically the point where the shear changes sign, for the weight of beam has slight effect when small as compared with the concentrated loads.

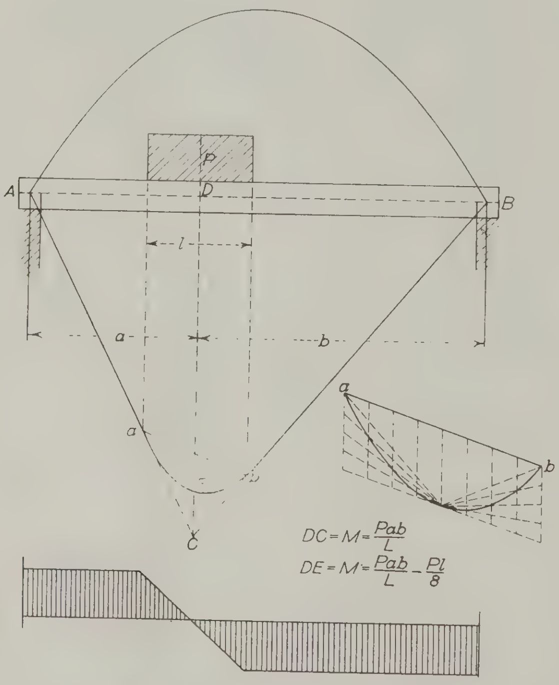


Fig. 30—Graphical Method for Concentrated Load with Wide Bearing

Design of Beams, Girders and Trusses

General Method for Position of Maximum Bending Moment

1st.—Find the reactions.

2d.—Starting from either end add the loads until a point is reached where the sum of the loads equals or exceeds the reaction at that end. This is the point of maximum bending moment.

General Method for Locating Point of Zero Shear

1st.—Call the left reaction positive (+) and the right reaction negative (—).

2d.—Call each load negative (—) and successively subtract from the left reaction each load, prefixing the proper sign until the sum of the sum of the quantities changes from positive (+) to negative (—). This is the point of zero shear and maximum bending moment.

An inspection will show the two rules to be identical.

For a uniform load the shear at any point distant x from either support is found as follows:

Shear at

$$x = \frac{wL}{2} - wx$$

When a moving uniform load is passing over the beam, a train of small trucks, for example, the maximum shear at any point

$$x = \frac{w}{2L}(L - x)^2$$

When the load covers the span $x = 0$ and the maximum shear at the ends $= \frac{wL}{2}$.

In Fig. 30 is shown a graphical method for ascertaining the bending moment when a load occupies a definite length on the beam. The triangle is first drawn as though the entire weight was concentrated at the center of gravity of the load. Drop vertical lines from the ends of the load to intersect the triangle. Connect the points of intersection by a straight line. Use this line as the base of a parabola, which is then constructed as shown. This method is also used if one end of the load rests on one abutment.

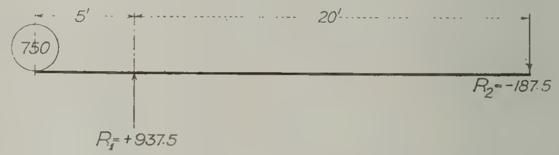


Fig. 31—Concentrated Load on Short Overhanging Beam

When beams overhang one or two supports the methods for obtaining reactions, bending moments and shears are no different from those used for cantilever beams and beams resting freely on two supports. The three examples following are from Green's Structural Mechanics (3d Ed.).

Studying Fig. 31 we see that the reactions are as follows:

$$R_1 = \frac{750 \times 25}{20} = 937.5 \text{ lbs.}$$

$$R_2 = 750 - 937.5 = -187.5 \text{ lbs.}$$

The weight of the beam has been neglected and the load at the extreme left tends to revolve the beam around R_1 so an additional load of 187.5 lbs. will be required at R_2 to hold down the right end. The negative sign indicates an upward pull.

The bending moment at R_1 is

$$M = -750 \times 5 = -3750 \text{ ft. lbs.},$$

indicating a negative bending moment, tending to make the beam convex at this support, showing tension to exist in the upper part and compression in the lower part of the beam. At section $x - x_1$

$$M = -R_2 \times 10 = -187.5 \times 10 = -1875 \text{ ft. lbs.}$$

also negative because R_2 is negative.

Check the moment at R_1 as follows, using R_2,

$$M = -187.5 \times 20 = -3750 \text{ ft. lbs.}$$

This beam has negative bending moments at all points.

In Fig. 32 the reactions are

$$R_1 = \frac{150 \times 25}{5} = 750 \text{ lbs.}$$

$$R_2 = 150 - 750 = -600 \text{ lbs.}$$

Note that the divisor is, in all cases, the distance between supports. Both reactions are large compared with the load, showing the absurdity of considering a beam to be fastened at supports when it runs only a short distance into a wall. No beam should be considered as tied unless it runs into a wall a couple of feet at least and actually carries enough load to counteract the amount of negative reaction.

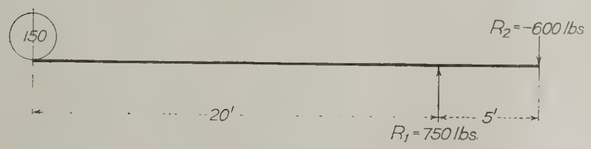


Fig. 32—Design of Beams, Girders and Trusses—Concentrated Load on Long Overhanging Beam with Supports Close Together

(To be Continued)

◆

Standardizing Workmen's Compensation

Nearly every state in the union has either passed a law or is about to do so, establishing the system of compulsory payment of damages to workmen who are injured in the course of their employment. The laws are not all alike; are not in many cases clearly drawn; are a prolific source of controversy, and have not resulted in the expected benefit of eliminating the lawyer from the procedure of compensating the injured. Where business is carried on by a concern in more than one state the problem of insurance against liability is the cause of much dissension and of much complication. If a workman employed in New York State is sent to do some work in New Jersey the compensation comes under the laws of the latter state because of the established principle that the laws in the place where an accident occurs must prevail and not those of the place where the contract of employment is made. Some of the large companies send men into many states and only most expert knowledge of the various acts will solve the intricacies involved. Private compensation systems which have worked effectively, and to the complete satisfaction of the workman, have been legally discountenanced even though their terms were more generous than those named by act of legislature. One great trouble is that each state has attacked the problem in its own way. While advantage has been taken of laws already enacted by other states and by various European countries, each succeeding state law is still built up to a large extent on the theories of its own people. A good deal of law has been made which is not sound, and some of it has been found to be unconstitutional. The work already done by investigators, legislatures and courts would seem to make it comparatively simple to frame an act, were not the material at hand so involved in contradictions and opposing theories. In the states where legislatures are now at work on workmen's compensation it is known that proposals are seriously considered which have been found unsatisfactory elsewhere.

◆

Making and Laying Composition Flooring

So many inquiries in regard to the report on "Flooring of Sawdust and Magnesium Chloride" have come to U. S. Consul Robert P. Skinner at Hamburg, Germany, that he has furnished some further information, which is especially interesting to American readers. It was stated in the original report that extensive use was being made in Germany of a flooring composed of the above-mentioned ingredients and which was especially useful in large office buildings and public halls. One inquirer asked particularly for the method of coloring the material and of governing its expansion and contraction. Consul Skinner says:

According to my information there should be neither expansion nor contraction of the material from any cause whatever, after a flooring of magnesium chloride is once laid. The very ingredients are such that there is no buckling or cracking due to heat or cold. In Hamburg the composition is mixed and spread where the building operations are being carried on, the prepared dry meal being delivered in bags from the factory and the lye water made on the spot. It is impossible to state the precise rule for the composition of the meal or for the lye solution, these being the manufacturers' secrets, and each manufacturer claiming particular merits for his own formula. These formulas are not patented, and there is no doubt that they are all substantially alike. Several manufacturers have expressed a willingness to sell their process, either for the whole of the United States or for a restricted territory. One Hamburg firm sold its formula for a small place in Southern Germany for $1,428.

The mixture of meal and lye water is made in a mortar box, and when a thickness of not more than two inches is proposed it is spread and smoothed with a hand trowel; when a thickness of four inches is desired, the material is tamped and then smoothed. The amount of lye water used in mixing the meal depends upon whether the flooring is to be simply spread or tamped; if spread the ordinary practice seems to be to use from 4 to 6 buckets of the lye water to one sack of meal, the sack apparently containing from 50 to 60 pounds.

These floorings were first utilized in large office buildings in Hamburg, and probably elsewhere, as a basic flooring for linoleum and also for the addition of artificial wood-marble flooring. These wood-marble floorings are substitutes for wood, and the panels are polished like hardwood floors; that is to say, smoothed with steel shavings and given a coating of wax. When linoleum is applied, it is glued to the magnesium-chloride foundation with a linoleum cement, which is said to be composed of copal resin and putty.

In Germany linoleum is never tacked to wood or artificial stone flooring, as is usual in the United States, but it is invariably glued in place, an ordinary flour paste being used when it is applied to wooden floors. Linoleum thus laid is washed afterwards with soap water and when dry given a coating of wax, exactly like a hardwood floor. This treatment is the ordinary practice in the large office buildings in Germany, even in hallways where thousands of people pass in the course of a week.

The magnesium-chloride flooring was first considered a particularly excellent foundation for linoleum, and it is only in comparatively recent times that it has been found possibly to color it and to lay it so attractively that no linoleum covering is necessary. It is laid tight against the side walls, making the entire floor waterproof.

◆

Building Operations in 1913

According to figures which have just been issued by the United States Geological Survey, the total cost of building operations in 1913 in the 147 cities from which it obtained its data was $859,657,250. In 108 of these cities the new wooden buildings erected cost $174,197,886 and new brick buildings $226,478,584. All other buildings cost $15,894,022. In 48 of the largest cities of the country the cost was $659,515,746, as compared with $738,989,710 in 1912.

The largest amount of building construction projected was in New York City, where total building operations aggregated $107,104,707, but this represents a decrease of $56,414,655 as compared with the previous year. Most of the cities which showed increases in 1912 showed decreases in 1913, while a few of the cities which showed decreases in 1912 showed increases in 1913. The latter statement is true, however, only with regard to the smaller cities.

The largest increase in any city was in Chicago, where the amount of building in 1913 was estimated to cost $6,492,527 more than in 1912.

◆

Function of a Builders' Association

The following pertinent comments are taken from the Monthly Letter of Secretary W. H. Sayward of the Master Builders' Association of Boston:

"The business man who isolates himself from his fellows makes a failure of his business life. No matter how much money he may accumulate, he is never a success, for he not only deprives himself of the support which others convey, but he deprives others of the strength and values he can convey to them, and thus misses the one great opportunity which business life affords: namely, to contribute effectively toward bettering the conditions under which business is conducted. However earnest a man may be, he can accomplish but little alone; to be effective, he must co-operate with others."

◆

Bungalow on Roof of an Office Building

Another example of a home upon the roof of a towering office building is found in the Bungalow apartment which has been fitted up on the roof of the 20-story skyscraper recently completed at 18 East Forty-first Street, New York City. It consists of a suite of five rooms, styled a "Bungalow Apartment," and with it goes a miniature garden. This outfit has been leased for the owner to Donald Brian, a well known actor.

Many of the modern skyscrapers have pent houses on their roofs, some serving as living quarters for the superintendent and his family; others are used for a variety of purposes, but so far as known the above is the first case of where the rooms on the roof have been rented out. The idea, however, suggests a way of utilizing roof space and it would not be surprising if in the course of time New York had many dwellings among the clouds, so to speak.

◆

Some Rapid Construction Work

It is reported that the new building now nearing completion for the Stanley Works at New Britain, Conn., is being erected so rapidly that the weekly progress photographs look more like the semi-monthly photographs on most structures. This building, which is being put up by the Aberthaw Construction Co., of Boston, measures 63 by 203 ft., seven stories and basement. Ground was broken during the first week of August, the foundations poured on August 28 to Sept. 11, the first floor slab on Sept. 14 to 16, the second floor slab Sept. 17 to 19, the third floor slab on Sept. 24 to 28, the fourth floor slab on Oct. 1 to 5, the fifth floor slab on Oct. 8 to 12, the sixth floor slab on Oct. 15 to 21, the seventh floor slab on Oct. 24 to 28. Roof centering was being erected Oct. 29, and the last section was poured Nov. 5.

◆

Limiting Hights of Houses in Minneapolis

The city council of Minneapolis, Minn., has adopted an ordinance limiting to two and one-half stories the hight of all frame buildings within the city limits. The measure also requires private hospitals to be housed in buildings of fireproof construction and prohibits the use of coal or wood stoves in garages or other buildings where gasoline is stored.

◆

Without doubt the tallest structure in the Borough of the Bronx is the ten-story apartment house which occupies the Flatiron plot facing Tremont Avenue. The structure is typically a flatiron building occupying a frontage of 132 ft. on the Concourse by 126 ft. on Mount Hope Avenue, and viewed from the street is a most picturesque affair.

A Country Cottage at Huntington, N. Y.

A Central Hall Extending from Front to Rear a Prominent Feature of This Comfortable Home

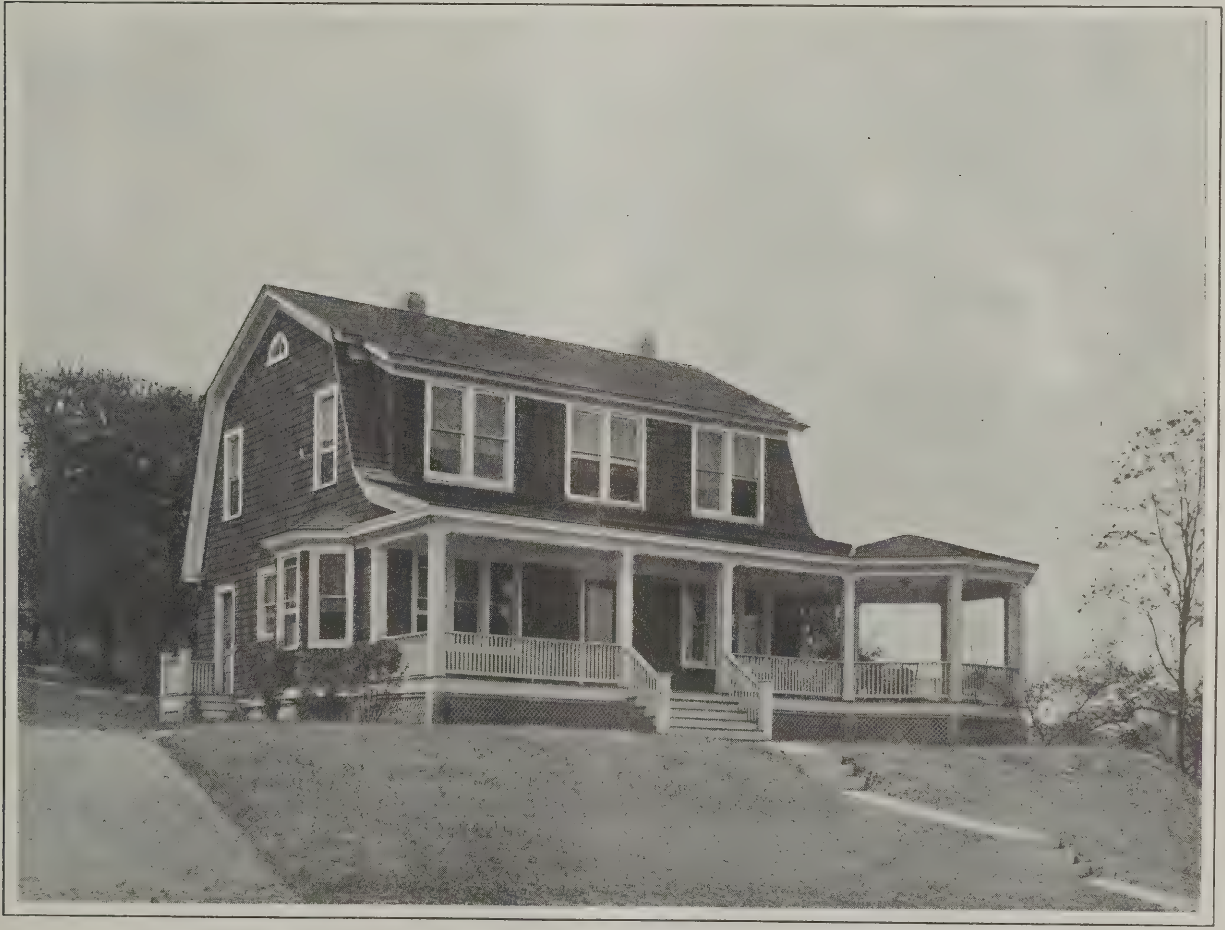
IN the designing of the country cottage here illustrated it has been the aim of the architect to provide such an arrangement as will render the house comfortable for its occupants; neat, simple and inexpensive in its construction; that all available space shall be utilized to the best advantage; that ample veranda space shall be provided, and that in its *tout ensemble* it shall present an attractive appearance.

According to the specifications the footings are of concrete, consisting of one part cement, three parts sand and five parts broken stone. The foundation walls are of concrete blocks laid in cement, the mixture consisting of one part cement to three parts sand.

The sills are of 4 x 6-in. chestnut; the girders are built up of three 2 x 10-in. chestnut members, well spiked together and the floor beams, also of chestnut, are 2 x 10 in., placed 16 in. on centers. The studs are of 2 x 4-in. spruce, placed 16 in. on centers, doubled at all openings and trussed for all openings more than 4 ft. wide.

The exterior frame of the cottage is covered with ⅞ x 6-in. yellow pine tongued and grooved sheathing, over which is placed a layer of "Un-x-ld" brand of sheathing paper. This in turn is covered with red cedar shingles laid with an exposure on the side walls of 5½ in. to the weather and on the roofs with an exposure of 4½ in. to the weather. The roof shingles are laid on spruce lath, placed 4½ in. on centers, these resting on 2 x 8-in. chestnut rafters, spaced 20 in. on centers.

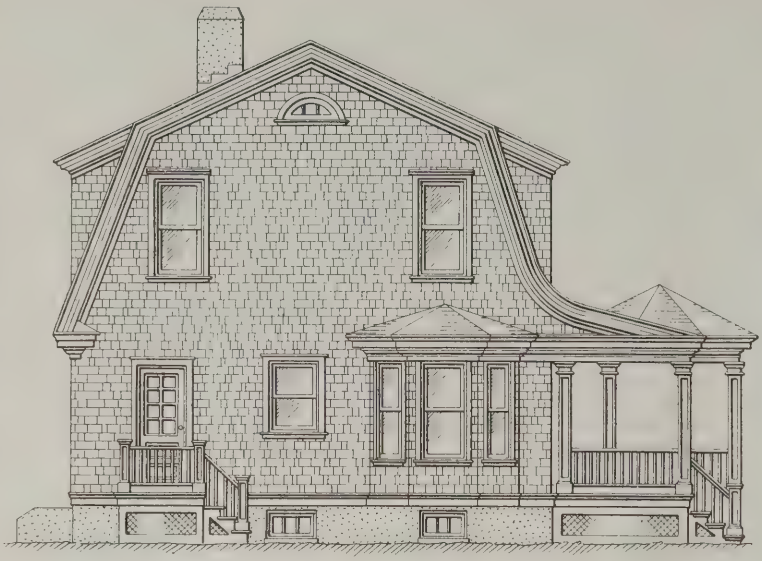
The floors are double, the rough or sub-flooring consisting of ⅞ x 6-in. yellow pine and the finish floors of ⅞ x 2¼-in. comb grained maple, laid over Cabot's two-ply deafening Quilt.



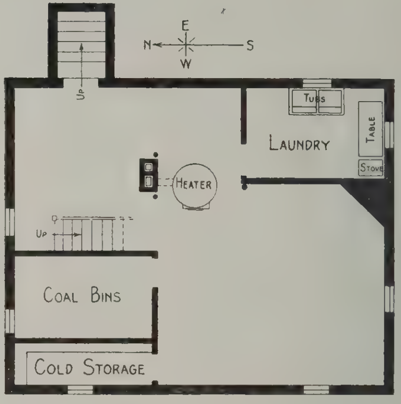
A Country Cottage at Huntington, N. Y.—Architect, Carrol E. Welch, of That Place

The porch floors are of 1⅛ x 2¼-in. white pine, laid with joints painted with white lead.

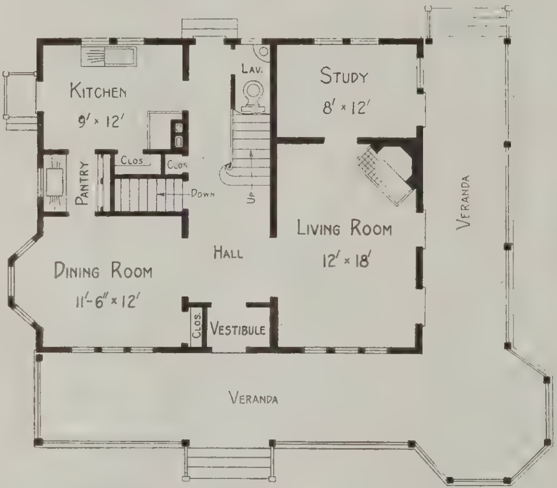
On entering the cottage from the front and leaving the spacious veranda with its large octagonal corner, one enters a roomy vestibule out of which opens a well lighted hallway. This hall runs entirely through the center of the house and has on its right the living room, while on the left is located the dining room. Toward the rear of the hall is a wide Colonial staircase leading to the sec-



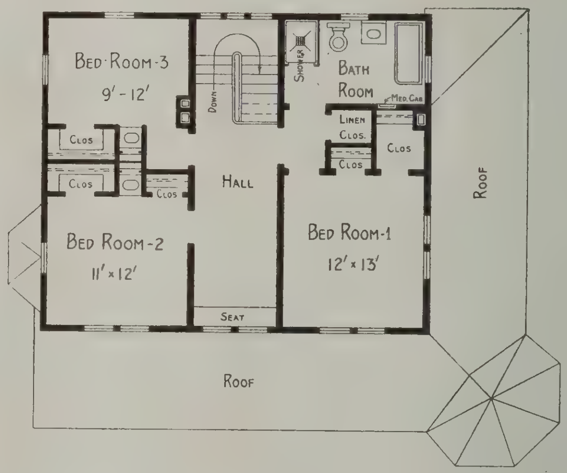
Side (Left) Elevation—Scale 3/32 In. to the Foot



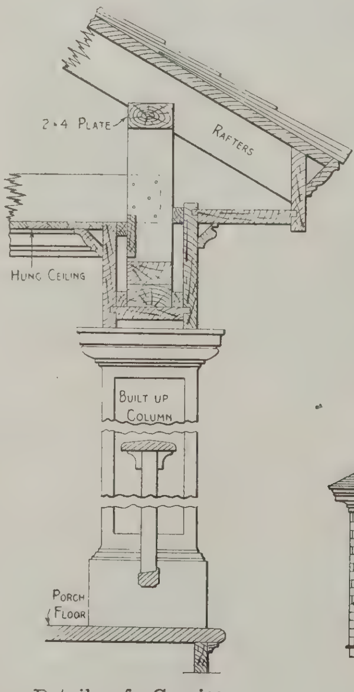
Cellar Plan—Scale 1/16 In. to the Foot



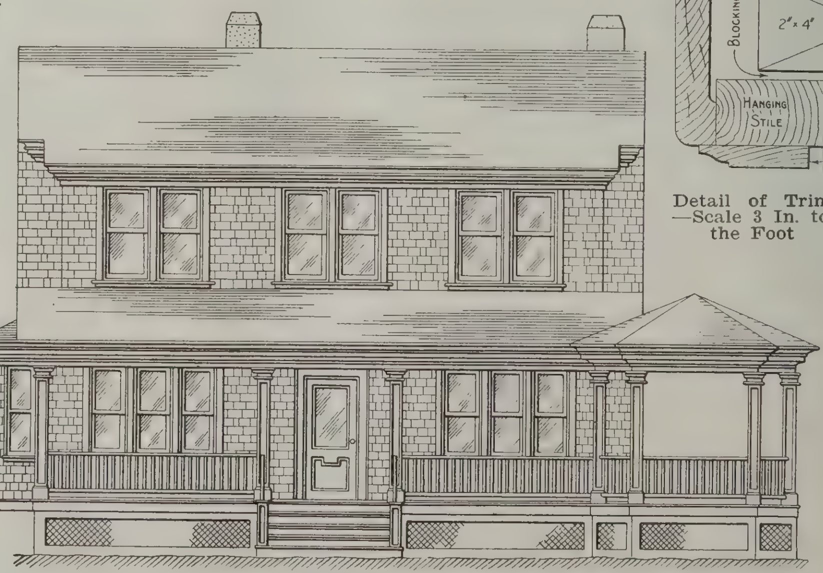
First Floor Plan—Scale 1/16 In. to the Foot



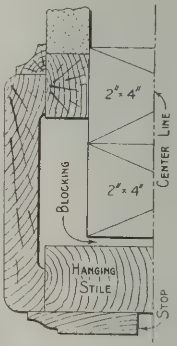
Second Floor Plan—Scale 1/16 In. to the Foot



Detail of Cornice and Porch Columns —Scale ¾ In. to the Foot

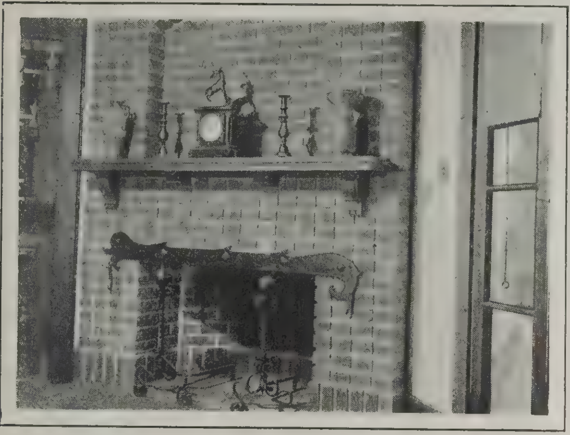


Front Elevation—Scale 3/32 In. to the Foot



Detail of Trim —Scale 3 In. to the Foot

A Country Cottage at Huntington, N. Y.—Plans, Elevations and Miscellaneous Details ond floor and concealing underneath a roomy lavatory. At the rear is a door which gives out upon the garden and apple orchard. The cellar stairs are accessible from the main hall and out of the latter opens a hat and coat closet.



The Brick Mantel in the Corner of the Living Room

The position of the kitchen is such that direct communication with the front door is established without the necessity of passing through any other room.

Looking Across the Hall from the Dining Room Into the Living Room

The living room is capacious, is well lighted and ventilated, while the two casement sash give free access to the veranda. The open fireplace—a feature of this room—is constructed of selected Fishers Island brick laid up as headers with 5/8-in. wide joints. The brick vary in color from light to dark burnt headers and there is a molded wood shelf and carved wood brackets. The back hearth is laid up with red fire brick while the hearth is of 6 x 6-in. Welsh red unglazed quarried tile with a 1/4-in. flush white joint. From the living room one enters the well-lighted Study which has a door communicating with the side veranda.

A feature of the dining room is the built-in china closet which is secured without sacrificing space. It is constructed with cupboards and two drawers under the countershelf and glass-doored dresser above with adjustable shelves.

Adjoining this room is the butler's pantry with double acting doors at both ends. This pantry contains a silver and glass sink with drip boards and a commodious china closet with six drawers below the countershelf and glass doored dresser above. The kitchen has porcelain sink and drip board and a large pot and storage closet. The kitchen has a separate outside service entrance.

The cellar contains the hot-water heating apparatus, coal bins and cold storage rooms with spacious laundry fitted with porcelain tubs, gas stove and ironing table.

The owner's bedroom designated as No. 1 has windows south and west, giving cross ventilation. Opening from it are two closets containing clothes poles, shelves, shoe racks, etc., with single mirror-panelled doors. The entrance to the attic is through the larger of these closets where is located a sliding ladder with trap door in the ceiling. Leading to the owner's room and bathroom is a lobby which contains the linen closet. The bathroom is wainscoted 4 ft. 6 in. high with Keene's cement marked off in 3 x 6-in. rectangles to represent tile and is white enameled. The room contains a shower bath enclosed by a dwarf partition with metal side walls and sheet lead floor, all white enameled. It also contains porcelain bath, toilet and pedestal lavatory as well as a built-in medicine closet with beveled mirror-panelled door.

On the other side of the house are two bedrooms, No. 2 having two closets, also a recessed porcelain lavatory, medicine closet and hat box. Bedroom No. 3 is used as a servant's room and contains one closet, recessed porcelain lavatory, medicine closet and hat box.

The rooms are plastered with three coat work. The trim consists of 7/8-in. plain casing 4 1/2 in. wide with applied wall cove.

The outside trim of the house was given three coats lead and oil painted "Dutch Boy" process. The living room and study has chestnut trim stained Early English and given two coats of spar varnish rubbed to an egg-shell gloss. The dining room has chestnut trim stained a golden oak to correspond to the living room. The pantry and kitchen have cypress trim.

The halls and bedrooms on the upper floor have cypress trim and were given three coats of lead and oil paint and two coats of "Vitralite" white enamel. The floors were given one coat of shellac and one coat of wax. The birch doors were finished to match the rooms in which they face and

The Dining Room Looking Toward the Bay Window

A Country Cottage at Huntington, N. Y.

in the halls and second floor rooms they are finished in mahogany.

The hardware is of antique brass, furnished by the Russell & Erwin Mfg. Company, 105 W. 40th St., New York City.

The entire house is piped for gas and wired for electric lighting.

In the kitchen is an Astor No. 80 range which, with the gas stoves, was furnished by the Union Stove Works, 70 Beekman Street, New York City.

A Country Cottage at Huntington, N. Y.—A Detail of the Porch Balustrade

The cottage is heated with a two pipe low pressure gravity hot water system with open expansion tank in the attic. A Volunteer boiler made by William H. Page & Co. is installed. The radiators are of the Peerless type made by the American Radiator Company. The piping for flow and returns are of extra heavy wrought iron protected with H. W. Johns-Manville asbestos sectional covering, muslin covered.

The following figures are the actual amounts of the different contracts:

Mason	$789.50
Carpenter	3,078.81
Plumber	435.51
Heating	386.03
Electrician	131.85
Total	$4,821.70

The painting of the house is included in the carpenter's contract. The cost of the cottage by the cubage system figures out as follows:

House proper	27,175 cu. ft.
Veranda and porches (¼)	1,779 cu. ft.
Total	28,954 cu. ft.

Dividing the cost, $4,821.70, by the cubic contents gives 16.3 cents per cubic foot.

The plans and specifications for this cottage were prepared by Carroll E. Welch, High Street, Huntington, Long Island, N. Y., and was erected under his direct supervision.

◆

Model Office Building in Ceylon

Our Consul at Colombo writing under recent date in regard to what has been described as "the most beautiful office building in the Middle East," gives some details with reference to the structure in order that firms in the United States may understand something of the sort of office building most appreciated at present in Colombo.

The new building, which was begun in April, 1911, and is now rapidly approaching completion, has a frontage of 151 ft. and a depth of 59 ft. The basement was excavated in solid Kabook (porous stone) earth and is wholly of cement concrete of a 1:3 mixture. The skeleton of the building is steel frame requiring about 350 tons of metal which was supplied by an English firm. The floors consist of 4 in. of a 1:3 mixture of concrete reinforced with No. 8 expanded metal of American manufacture.

The floors are finished with "Conolite" and tiles. The whole of the stone work has been treated with Berelmy petrifying liquid and all internal walls distempered. The total cost of the building will be about $225,000 and it will be the business home of five or six export and import firms, among the largest in Colombo.

◆

Another New Office Building

Another improvement in the Herald Square zone will be a 21-story office building to be erected at the southeast corner of Broadway and Thirty-seventh street, New York City, and extending through to Sixth avenue. The façades will be of brick and Indiana limestone and the design will be of the Italian renaissance. The building will have a frontage of 105 ft. on Broadway, 197 ft. in Thirty-seventh street and 23 ft. on Sixth avenue. It will be of fireproof construction and 276 ft. high. The plans, which have just been filed by Architects Ernest and Montague Flagg, 109 Broad street, New York City, estimate the cost at something more than $1,000,000. We understand that work of construction will not be commenced immediately.

The Newel of the Main Flight of Stairs

◆

Due to the great European war, the source of supply of Circassian walnut has been cut off and we are turning to the use of our own native walnut, which is again becoming very popular. Before the war most of our native walnut was sent to England, Germany and France.

The Quantity System of Estimating

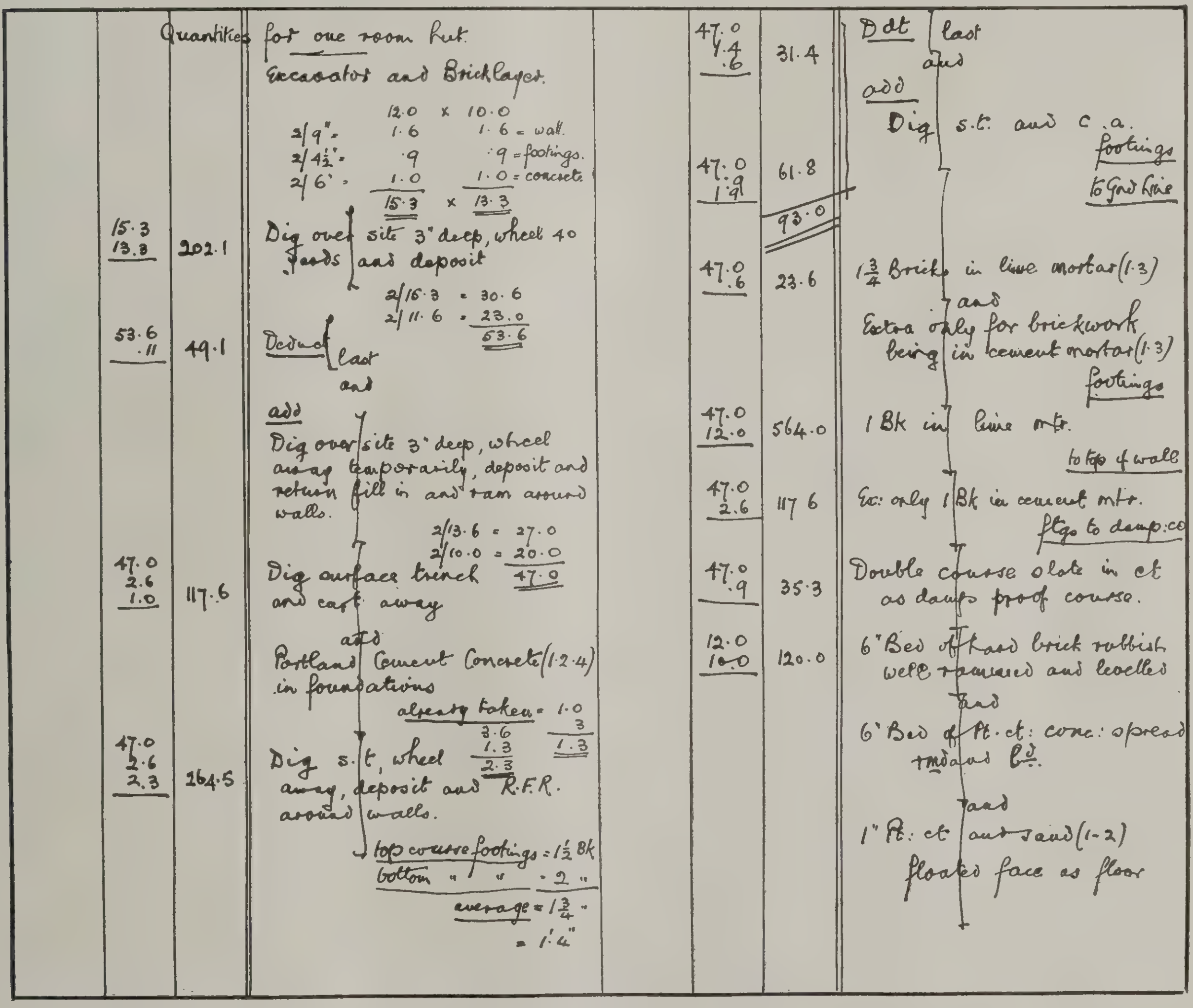
Method of Estimating for Building Contractors as Practiced in England—A Simple Example

By G. Metson *

IN the issue of the paper for February of the present year the advantages of quantities in building contracts were dwelt upon to some extent. The method of taking off quantities on the London System is now shown by means of a simple example, but it may be remarked the system is the same no matter how large the proposed building.

As there is some small difference in nomenclature between English and American technical terms, the words in the "taking off" have been written at first in full, but the professional quantity surveyor adopts accepted abbreviations, so that the work of taking off is very rapid. Where a word appears a second time in the quantities given, the abbreviated form has been used.

In the second column are entered the "dimensions." In the fourth the "description." The third column is used for "squarings," whilst the first is used for "timesing"—in which a stroke means "times" or multiply and a dot means "add on." The figuring and words underlined in on the right hand side of the description column is known as "waste," i.e., it is information showing how the dimensions are arrived at and where they are for. Waste items are of great use at the time of adjusting variations at the end or during contracts.



			Quantities for one room hut. Excavator and Bricklayer. 12.0 x 10.0 2/9" = 1.6 1.6 = wall. 2/4½" = .9 .9 = footings. 2/6" = 1.0 1.0 = concrete. 15.3 x 13.3
	15.3 13.3	202.1	Dig over site 3" deep, wheel 40 yards and deposit 2/15.3 = 30.6 2/11.6 = 23.0 53.6
	53.6 .11	49.1	Deduct last and add Dig over site 3" deep, wheel away temporarily, deposit and return fill in and ram around walls. 2/13.6 = 27.0 2/10.0 = 20.0 47.0
	47.0 2.6 1.0	117.6	Dig surface trench and cast away and Portland Cement Concrete (1.2.4) in foundations already taken = 1.0 3 1.3 3.6 1.3 2.3
	47.0 2.6 2.3	264.5	Dig s.t, wheel away, deposit and R.F.R. around walls. top course footings = 1½ Bk bottom " " = 2 " average = 1¾ " = 1'4"
	47.0 4.4 .6	31.4	Ddt last and add Dig s.t. and c.a. footings to Grd Line
	47.0 .9 1.9	61.8 93.0	
	47.0 .6	23.6	1¾ Brick in lime mortar (1.3) and Extra only for brickwork being in cement mortar (1.3) footings
	47.0 12.0	564.0	1 Bk in lime mtr. to top of wall
	47.0 2.6	117 6	Ex: only 1 Bk in cement mtr. ftgs to damp:co
	47.0 .9	35.3	Double course slate in ct as damp proof course.
	12.0 10.0	120.0	6" Bed of hard brick rubbish well rammed and levelled and 6" Bed of Pt. ct: conc: spread r'md and l'd. and 1" Pt: ct and sand (1-2) floated face as floor

The Quantity System of Estimating—Sheet Giving the Various Dimensions

Where there are three rows of figures to one dimension it shows an item of work that is billed in cubic yards. Two rows show one billed in square yards or squares (100 feet superficial). One row of figures shows an item billed per foot run. How to know in what manner to book a dimension is best learned by studying the easiest way to price the particular description of work, e.g., excavation is billed in cubic yards as it is easily known how long it takes to excavate a cubic yard and also how many carts are required to cart away the total yards billed; again, timber for construction is bought by the load of 50 cubic feet in London, hence joists, rafters, plates, etc., are billed in cubic feet; again flooring is billed in squares, as the contractor purchases his flooring in that denomination. In American practice these denominations may differ, when the method of booking a dimension—cubic, superficial or lineal—can be altered to suit the prevailing method of pricing or purchasing materials—leaving them in the denomination in which they are most easily priced.

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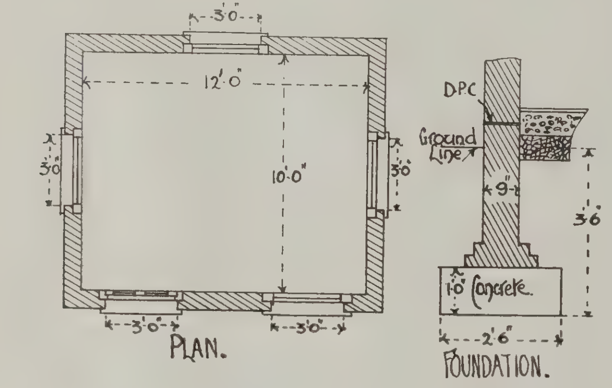
*Lic. Royal Institute of British Architects. Lecturer on Quantity Surveying at the Borough Polytechnic Institute, London, England.

After all the "taking off," i.e., booking the dimensions is completed, the items are squared (third column), when they are abstracted, the dimension item being scored through as each item is entered in the abstract.

When the abstract is complete, the bill is merely a fair copy of the totalled or "reduced" abstract, and again the items on the abstract are scored through as each one is entered in the bill.

The taking off, abstract and bill are given in manuscript form in order to show style and method of preparation.

In the example of taking off the waste clearly shows how the 15 ft. 3 in. x 13 ft. 3 in. digging over the site is made up. The second item is for the excess measured in the first one, for the portion that has to be returned to the outside of the walls. The third dimension is for the digging to that portion of the trench occupied by the concrete, so that the one dimension is used for the description of both "digging" and "concrete," the two being separated by the word *and,* the use of which avoids the writing of the dimension down again for the concrete. The fourth dimension is for the surface trench from the top of concrete to ground line. Obviously the portion of earth in the trench that will be occupied by the footings and wall cannot be returned, so the adjustment is made on the sixth dimension for the footings portion, and the seventh dimension adjusts it for the wall portion.



The Quantity System of Estimating—Plan and Section of Building Used as the Example

In order to save a lot of dimensions and their consequent squaring and abstracting, footings are averaged for brickwork. The majority of the brickwork is in lime mortar, so that all is taken in lime mortar, and the small portion (up to damp course) that is to be in cement mortar is measured as "extra only for being in cement mortar." The other dimensions call for no comments.

In the abstract each trade commences with cubic items, followed in turn by superficial, lineal and number ones. This order is always kept to. The item when ready to go to the bill has two lines placed under it—and before the bill is written the abstract is checked again and ticked by the checker.

As all items in the squaring columns are in feet and inches, when they get totalled up on the abstract they are "reduced," i. e. divided by 27 for cubic items, 9 for superficial ones, and for brickwork by 272 to bring it to rods, etc.

Anything under half a foot is ignored. Half or over is counted another foot, so that the item for foundation concrete becomes 4 yd. 12 ft. and not 4 yd. 11 ft., whilst the first item on the abstract remains at 6 yd. 9 ft. and not 6 yd. 10 ft.

Excavation over 12 in. deep is billed in yards cube, and 12 in. deep or under (being the top soil and generally useful for garden purposes) is kept separate in yards superficial.

Brickwork in London is billed in rods of reduced thickness, i. e. 1½ bricks thick—a rod equals 272 ft. super. or 16½ ft. x 16½ ft.

As was stated in my previous article, system and order in taking off are essential to ensure that there is no duplication, or omission of any items. It must be admitted that the example shows a sure method of arriving at the quantities of work shown in the illustration. The walls are taken solid, without deductions for doors or windows. These deductions will be made under other sub-heads, viz.:—"external openings" and "doors and windows."

All other subheadings of work as "roofs," "windows," "doors," etc., are just as simply taken off in the London system as the present example of the subheading "excavation and brickwork," and each subhead is clearly defined, so that one does not overlap the other.

Specifications

Dig over a site to bottom of hard brick rubbish, and deposit earth 40 yards away from the hut.

The concrete to be composed of one part cement, two of clean river grit and four of clean ballast.

The brickwork to be in lime mortar (1-3) except up to damp course level which is to be in cement mortar (1-3).

The walls are 10 ft. high above ground line.

The damp course to be a double course of slate in cement.

The cement concrete over site to be faced with one inch of Portland cement and sand (1-2).

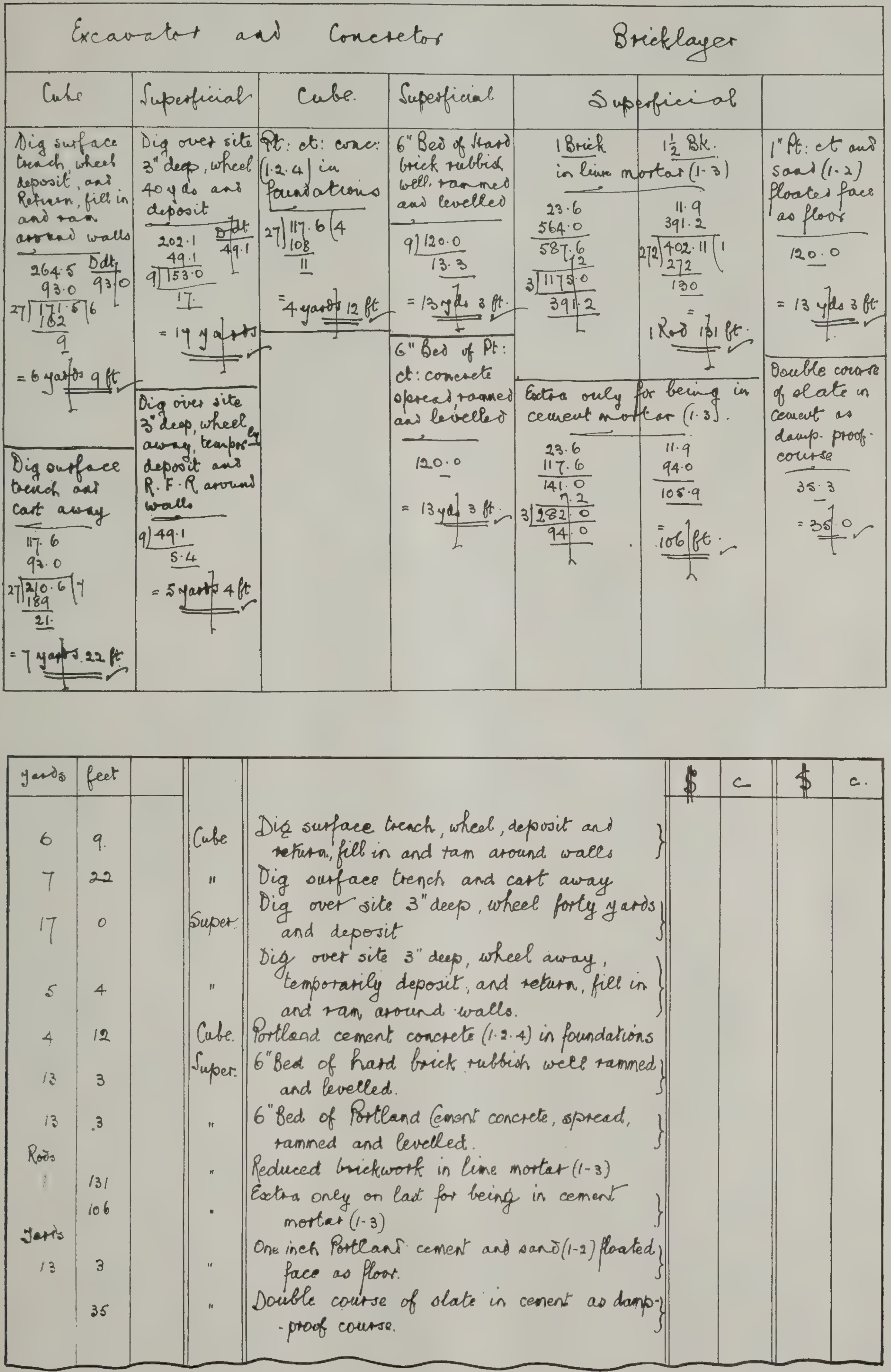
◆

How to Make a Hole in Glass

Cover the glass with clay or putty for a few inches around the place where the hole is wanted. With a pencil or small stick, make a hole in the clay or putty the size of the hole required. Pour this hole full of melted lead.

◆

The Ceylon Governmeent has sanctioned a scheme for the erection on the outskirts of Colombo, of 54 Bungalows ranging from nine to twelve rooms each, for the use of Government officials. The houses will be of cement construction with modern sanitary fittings and are to be completed within two years.



Excavator and Concretor				Bricklayer		
Cube	Superficial	Cube.	Superficial	Superficial		
Dig surface trench, wheel deposit, and Return, fill in and ram around walls 264.5 93.0 Ddt. 93.0 27) 171.5 (6 162 9 = 6 yards 9 ft.	Dig over site 3" deep, wheel 40 yds and deposit 202.1 49.1 Ddt. 49.1 9) 153.0 17. = 17 yards	Pt: ct: conc: (1.2.4) in foundations 27) 117.6 (4 108 11 = 4 yards 12 ft	6" Bed of Hard brick rubbish well rammed and levelled 9) 120.0 13.3 = 13 yds 3 ft.	1 Brick in lime mortar (1-3) 23.6 564.0 587.6 2 3) 1175.0 391.2	1½ Bk. 11.9 391.2 272) 402.11 (1 272 130 = 1 Rod 131 ft.	1" Pt: ct and sand (1-2) floated face as floor 120.0 = 13 yds 3 ft
Dig surface trench and cart away 117.6 93.0 27) 210.6 (7 189 21. = 7 yards 22 ft.	Dig over site 3" deep, wheel away, temporarily deposit and R.F.R around walls 9) 49.1 5.4 = 5 yards 4 ft		6" Bed of Pt: ct: concrete spread rammed and levelled 120.0 = 13 yds 3 ft.	Extra only for being in cement mortar (1.3). 23.6 117.6 141.0 2 3) 282.0 94.0	11.9 94.0 105.9 = 106 ft.	Double course of slate in cement as damp-proof course 35.3 = 35.0

yards	feet				$	c	$	c.
6	9.		Cube	Dig surface trench, wheel, deposit and return, fill in and ram around walls				
7	22		"	Dig surface trench and cart away				
17	0		Super.	Dig over site 3" deep, wheel forty yards and deposit				
5	4		"	Dig over site 3" deep, wheel away, temporarily deposit, and return, fill in and ram around walls.				
4	12		Cube.	Portland cement concrete (1.2.4) in foundations				
13	3		Super.	6" Bed of hard brick rubbish well rammed and levelled.				
13	3		"	6" Bed of Portland Cement concrete, spread, rammed and levelled.				
Rods								
1	131		"	Reduced brickwork in lime mortar (1-3)				
	106		"	Extra only on last for being in cement mortar (1-3)				
Yards								
13	3		"	One inch Portland cement and sand (1-2) floated face as floor.				
	35		"	Double course of slate in cement as damp-proof course.				

The Quantity System of Estimating—At the Top Is Shown the "Abstract" and at the Bottom of the Page What the Author Describes as the "Bill"

The Panama Exposition at San Diego

Some of the Features Which Will Interest the Visitor—Pictures of Buildings and Construction Work

SUPPLEMENTING what appeared in these columns a few months ago regarding the Panama-Pacific Exposition which opens in San Diego, Cal., on the first of January, 1915, we present for the consideration of our readers a few additional particulars and pictures of some of the more important buildings and construction work. In order, however, to understand fully the spirit back of the San Diego Exposition especially in its landscape features it is necessary to know something about the history of the Southwest. It is 401 years since Balboa went beyond the point which Christopher Columbus had reached in 1492, crossed the isthmus and from the highlands looked down on the peaceful waters of the Pacific, claiming for his country all the lands it touched. It was not, however, until 1542 that an expedition started north to see what these lands were like. Juan Rodrigues Cabrillo, a Portuguese adventurer in the service of Spain, headed the party, sailed to San Diego and anchored in the Harbor of the Sun. For a long time the port went under the name of San Miguel, and it was not until years later that the name of San Diego was given to it. Early in the next century Viscaino led the second Spanish party to touch on the west coast. He landed before Hendrik Hudson carried the Dutch flag into New York Harbor and before the Pilgrim Fathers landed at Plymouth.

There is a wealth of romance connected with the history of the settlement of Lower California and once this is studied we see that the finest traditions, the rarest poetry and beauty are in the recollections of the old Spanish civilization. It was the realization of that beauty, almost forgotten, which impelled the San Diego Exposition to choose a certain beautiful and harmonious type for its buildings — not the old conventional Greek and Roman temples such as expositions of the past had built—but quaint Spanish missions, cathedrals and palaces in perfect accord with the gorgeous beauty of the mighty landscape one sees from the mesa where the exposition buildings rear their heads toward the azure sky. There are no forbidding walls, nor entrances so massive as to overwhelm the visitor, but a calm, sweet beauty which spreads over all—everything purely Spanish and purely delightful. Here one finds the atmosphere of an old Spanish city, such a city perhaps as Cabrillo and his bearded sailors dreamed of as they stood on the same site nearly 400 years ago and looked off toward the sea and looked forward many years to the futile hope of new Spain's glories.

That Spanish atmosphere has been carried to the finest detail in that the guards and attendants of the exposition will be garbed as caballeros and conquistadores, and the dancing girls, who will move to the hum of the guitar and mandolin and the click of the castanet, will be Spanish dancing girls in the bright costumes of old Spain in the dances which have been performed for hundreds of years in the plazas of Castile. Down the Prado stretch the buildings, some of cathedral design, some of old Mission, some of the palace and one or two bear a particularly strong touch of Moorish influence—but all are uniformly and quaintly Spanish in their varied aspects.

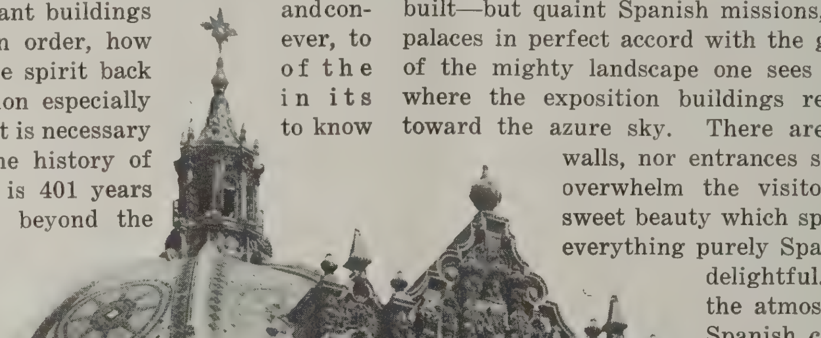


Fig. 1—Ornate Treatment of the Front of the California State Building at the San Diego Exposition

The purpose of the San Diego Exposition is a purpose not alone of building up the community of

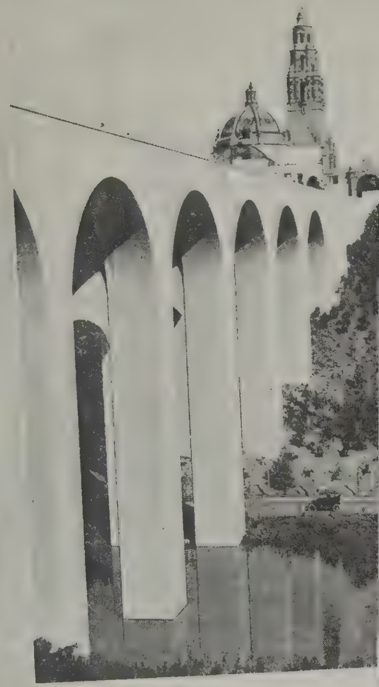


Fig. 2

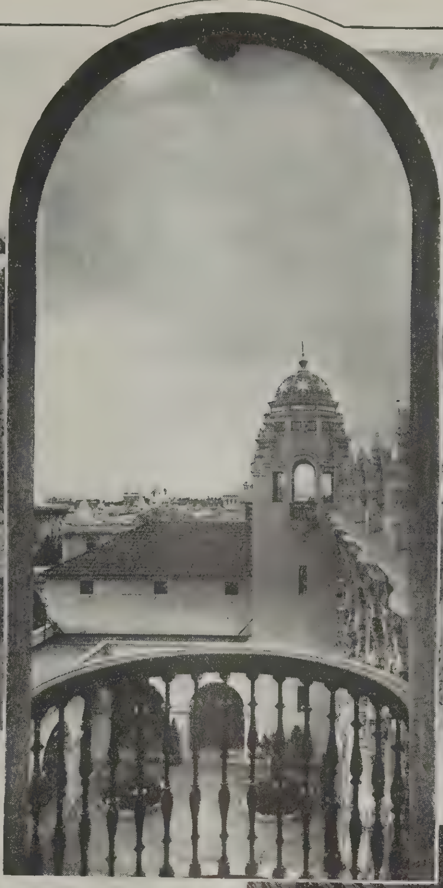


Fig. 3

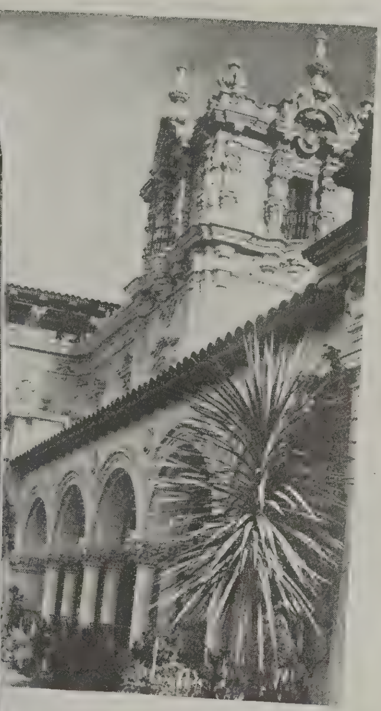


Fig. 4

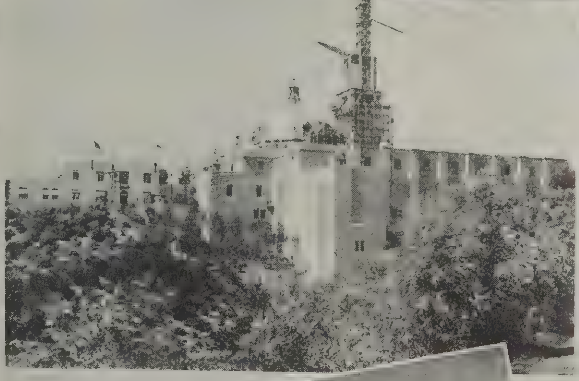


Fig. 5

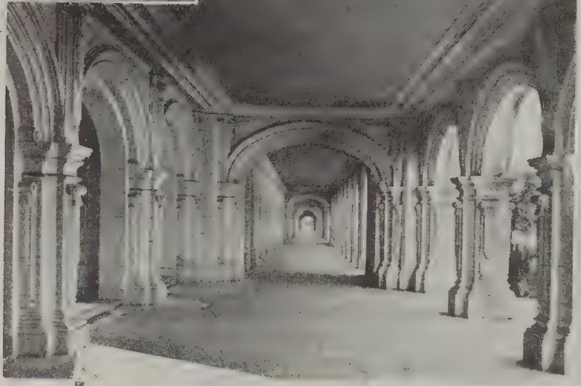


Fig. 6

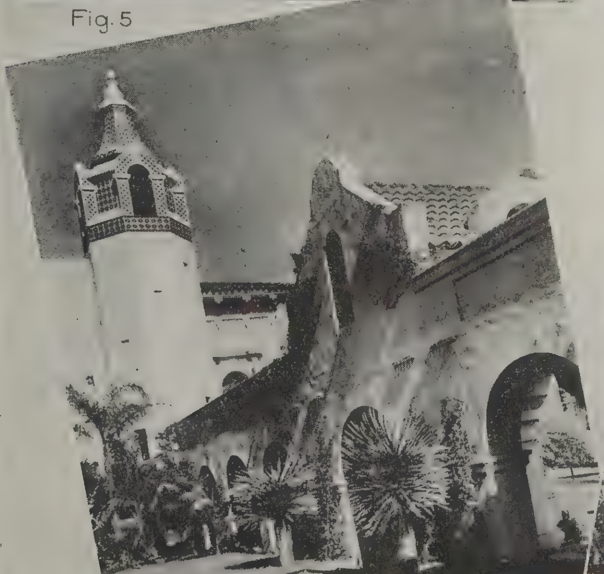


Fig. 7

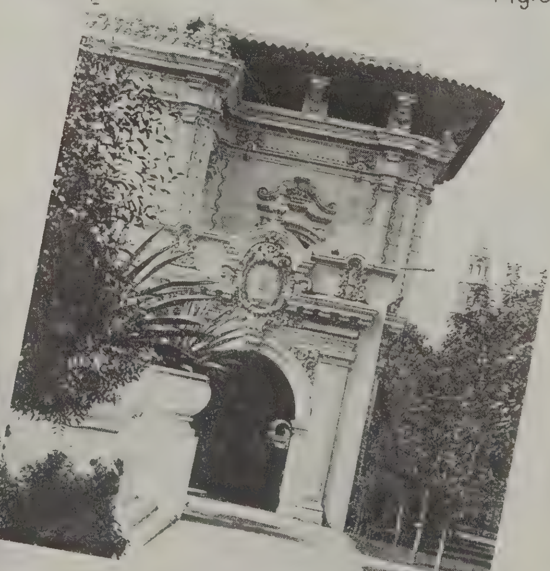


Fig. 8

Some Views of the Panama-Pacific Exposition at San Diego, California

San Diego but of helping all California, all the Southwest, all the West, and indeed, all the nation in its agricultural and industrial features.

The California State Building

Prominent among the buildings is that of the State of California, domed and towered, and representing in its entirety a restoration of the best cathedral architecture of Spain in the old and new worlds. The treatment of the front of this building as shown in Fig. 1 is a strikingly ornate piece of work. At the extreme top is the figure of Fray Junipero Serra, this being a tribute to the service of the Franciscan friar performed in starting the civilization and development of the American West. The full length figures below at the right of the observer are Cabrillo, the discoverer, over whom appears the bust of his patron, Carlos V; to the left Viscaino, who headed the second party, and over him the bust of Philip III. Below these full length statues are the bust of Portola, the first governor of California, and Vancouver, the first English explorer.

Below these in turn are de l'Ascension, the historian of the first party, and Fray Jaume, the first white martyr of the coast. The figure in the doorway is one of the exposition guards attired in a costume of the Spanish court.

The dome appearing in the background is modeled after the dome of the Cathedral at Oaxaca in Mexico.

The lofty tower to the right of the picture in Fig. 1 is the California Building viewed in Fig. 9 from a pergola by the Canyon Cabrillo, and which stretches upward for 200 ft. At its top is a weather vane consisting of a model of the Caravel of Cabrillo which is exactly 500 ft. above the level of the sea.

The Great Puente Cabrillo

The great Puente Cabrillo, Fig. 2, the first large cantilever-unit viaduct of reinforced concrete to be erected, forms an imposing west entrance to the grounds of the San Diego Exposition. Its seven piers rise from a pool in the canyon 135 ft. below. Each pier sustains the weight of half the arch on each side with a space of about 1 in. left to break the arch and afford space for expansion and contraction without affecting the strength of the structure.

The two buildings between which passes the Prado—a continuation of the viaduct line—are also of reinforced concrete with concrete stone façade and rich tile decoration in domes and the tall campanile of the California Building seen in the background.

The Ethnology Building, with which it is joined by a double arcade, is entirely different in design following the quiet lines of the old Cathedral Mission with the rough adobe cloister, roofed by rough wooden beams and the deep window recessions, which are practically the only ornament appearing about its blank walls.

In Fig. 3 is a view from a tower overlooking the Prado showing Spanish cloister below the balcony. The Harbor of the Sun appears in the distance and still further Point Loma and Fort Rosecrans. Fig. 4 shows the colonnade of entrance to the Commerce and Industries Building. The open colonnade at the right opens into a path to a small presidio overhanging the Canyon Español and looking down to the sea. Fig. 5 is a view of the west group from the edge of a canyon. Fig. 6 is the arcade at the main entrance of the Commerce and Industries Building. Fig. 7 represents a quiet Patio showing the start of floral growth in one of the quiet little gardens which appear frequently about the grounds. Fig. 8 is the end of a long cloister and gives a closer view of one of the colored cornices with the tower of the California State Building in the background.

Buildings on the Lower Plateau

Off on the lower plateau, where the state buildings stand, is the New Mexico Building, also Spanish colonial and also mission, but of the older mission type which came into being a century and a half before the California type. It partakes of the Pueblo Indian style, with straight lines, no arcade, and rugged simplicity throughout, and yet is as unmistakably Spanish as the fine old cloistered mission of later date. On the lower edge of the Plaza de Panama, some 500 yards beyond, is another type—the palace—and a bit further the Municipal Building. Away beyond at the foot of the "Isthmus," which is San Diego's name for the old-time Midway or Pike, is a structure purely Moorish, with the pointed arch, the arabesque, the minaret and the other Moorish features which eventually became absorbed in some measure by Spanish architecture itself. At the east end of the Prado one of the buildings has the colored cornice, a blaze of crimson and gold, the only one of the main buildings to carry that feature.

The entire exposition stands on the crest of a sightly mesa 300 feet above sea level, looking down over the highest buildings of the city, down to the harbor, to Coronado, and on to the sea. One can look up the valleys through one of the finest fruit sections of the country to the low hills of Mexico, less than twenty miles away, or back to the high peaks of the Sierras. In the foreground is a sweeping canyon, three years ago a barren waste, to-day a thick jungle of palm and acacia and eucalyptus and cypress, flashing here and there with brilliant wild flowers.

Buildings Which Front on the Prado

The buildings which front on the Prado and the plazas carry long, arched arcades, up whose pillars climb the blazing vines of southern California, the iron gratings concealed by low shrubbery and beds of gladiolus and poinsettia, the lawns lined with black acacia. The patios are thick with floral life which reaches up to the small rug-covered balconies, to the towers and domes, to the archways, where mission bells swing. Where the canyon juts in close to the buildings the rear wall of a mission rises from far down the slope. Where the canyon is a hundred yards distant there is a broad lawn with an occasional pergola over whose beams clamber rose and honeysuckle and bougainvillea, with a border of other flowering plants along the edge of the gulf. There are formal gardens and cool walks beneath the palms and a quiet grove of pepper trees between which appear faint vistas of the buildings on another plateau or the sturdy Point Loma, where are concealed the guns of Fort Rosecrans or the rocky outlines of the Coronado Islands in Mexican waters.

The rose trellis surrounding the exposition grounds includes 614 acres, but outside is the remainder of a 1400-acre park which has been improved in the same manner, so that it might be included in exposition property. Unlike most world's fairs of the past, San Diego has ample space for the better display of its beauties, and in that factor finds a highly important attribute to the general harmonious beauty. The large buildings at San Francisco do not appear at the exposition 600 miles south, for the southern California city has utilized out-of-doors wherever possible, placing many of the industrial exhibits out of doors and keeping the gates open from New Year's Eve for a year and a day, to come. The landscape architecture, as well as that of the buildings, is under the direction of Frank P. Allen, Jr., who served at the Seattle Exposition.

The Panama-Pacific Exposition at San Diego—Fig. 9—The California State Building as Seen from a Pergola Near the Canyon Cabrillo

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Applying Stucco to Brick Work

In applying stucco to old brick walls, the most important point is that the old surface must be thoroughly cleaned; if coated with paint, this must be scraped or burned off, and if uncoated, the surface must be washed with a solution of muriatic acid mixed in the proportion of 1 part commercial muriatic acid to 5 parts of water. The wall should be scrubbed with this solution, then thoroughly cleansed with clean water.

The joints between the brick work should be picked back from the face of the bricks to a depth of ½ in. to ¾ in., so as to form a key for the plaster. Immediately before applying the plaster, the surface of the walls should be thoroughly soaked with water, for, on account of the porous nature of the brick, water would be absorbed from the plaster, thus injuring its strength, unless the brick were thoroughly saturated beforehand. After this the work does not differ materially from ordinary stucco construction.

Sometimes, instead of applying the cement plaster directly to the brick, metal lath is fastened to the brick and the stucco placed on it, says C. W. Boynton in an exchange. Metal furring strips are attached to plugs driven into the joints of the brick work, and the lath is fastened to these strips. This method of construction is always advisable for covering brick chimneys so as to prevent cracking due to extreme temperature changes.

In applying stucco to new brick work, the procedure is practically the same as described, except in the matter of cleaning off the surface, though the walls should be brushed to remove any mortar that may have splashed on the surface of the brick at the time of laying up the wall.

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The eighth annual convention of the National Society for the Promotion of Industrial Education will be held in the city of Richmond, Va., December 9 to 12, 1914.

A Cement-Coated Hollow Tile House

A Seven-Room Cottage Well Adapted for Erection Upon a Suburban Site—Some Figures of Cost

WE have taken for the subject of our colored supplemental plate this month a type of construction which is meeting with much favor by reason of its fireproof qualities and its ultimate economy as regards cost of repairs, low rate of insurance, etc. The construction is of imperishable materials, the exterior walls being of hollow tile, stucco coated, and the roof of a flat vitrified tile. This material, which is reasonable in initial cost, is easily handled by the contractor; will insure a home that is practically safe from fire; will be cooler in summer and warmer in winter than if built of other materials and is one that reduces the cost of maintenance to a minimum.

Principal Features

Among the principal features are the compactness of the plan, all the principal rooms being on the first floor with two sleeping rooms in the attic; the large living room with its beam ceiling, cozy nook and built-in bookcases; the dining room with its built-in buffet, beam ceiling and French casement doors that connect with the private porch which can in the summer months be used for dining purposes; the location of the kitchen and the easy access to the sleeping rooms, to the cellar and to the outside of the house without the necessity of passing through the principal rooms.

One chimney serves for the kitchen range, the furnace in the cellar and the fireplace in the living room. The arrangement involves one line of plumbing for bath room and kitchen fixtures.

The hollow tile blocks used in the exterior walls of the building have their faces scored with special dovetail scoring to furnish a good surface for the stucco work. The blocks are laid with the cores running vertically in order to develop their full strength. Where interior partitions are constructed of hollow tile the blocks may be laid on the side, if so desired, although the strength when thus placed is not so great as when the cores are vertical.

The mortar used in laying up the hollow tile blocks is to consist of a standard cement and clear sharp sand in the proportion of one of cement to three of sand.

Details of Construction

According to the architect's specifications the foundation walls are to be built of 12 x 12 x 12-in. tile blocks from the top of the concrete footings to the under side of the first floor beams. Care should be taken at the corners to use 6 x 12 x 12-in. blocks in order to secure a running bond in the wall. The outside of the walls from the footings to a point above grade should be given a heavy coat of waterproof cement plaster.

Where columns or piers supporting heavy loads rest on the foundation wall they will be filled with concrete from footing to top of wall so as to prevent the possibility of failure due to compression.

The Exterior Walls

The exterior walls above grade will be of blocks 8 x 12 x 12 in. All hung windows have special jamb blocks with rabbeted openings to receive the window frame box. The space between the blocks and the frame box is to be well filled with mortar so as to prevent the passage of air or moisture through it. The lintels over all openings are to be constructed of steel L's or with special lintel blocks reinforced with steel bars and concrete. All sills are to be formed of hollow tile sill blocks and all arched openings are to be built of two course row-lock common or hollow brick header arches carefully laid on substantial centers. The porch columns and piers will also be of hollow tile.

Embedded at intervals of 5 ft. in the outside wall under the roof plate will be ¾-in. bolts 30 in. long and projecting 6 in. above the top of the wall for the purpose of fastening the wall plate securely in position. One-inch slabs should be placed on the tile course directly below the bolts.

All concrete used will consist of one part cement, two parts clean sharp sand and four parts broken stone of such size as will pass through a ¾-in. ring.

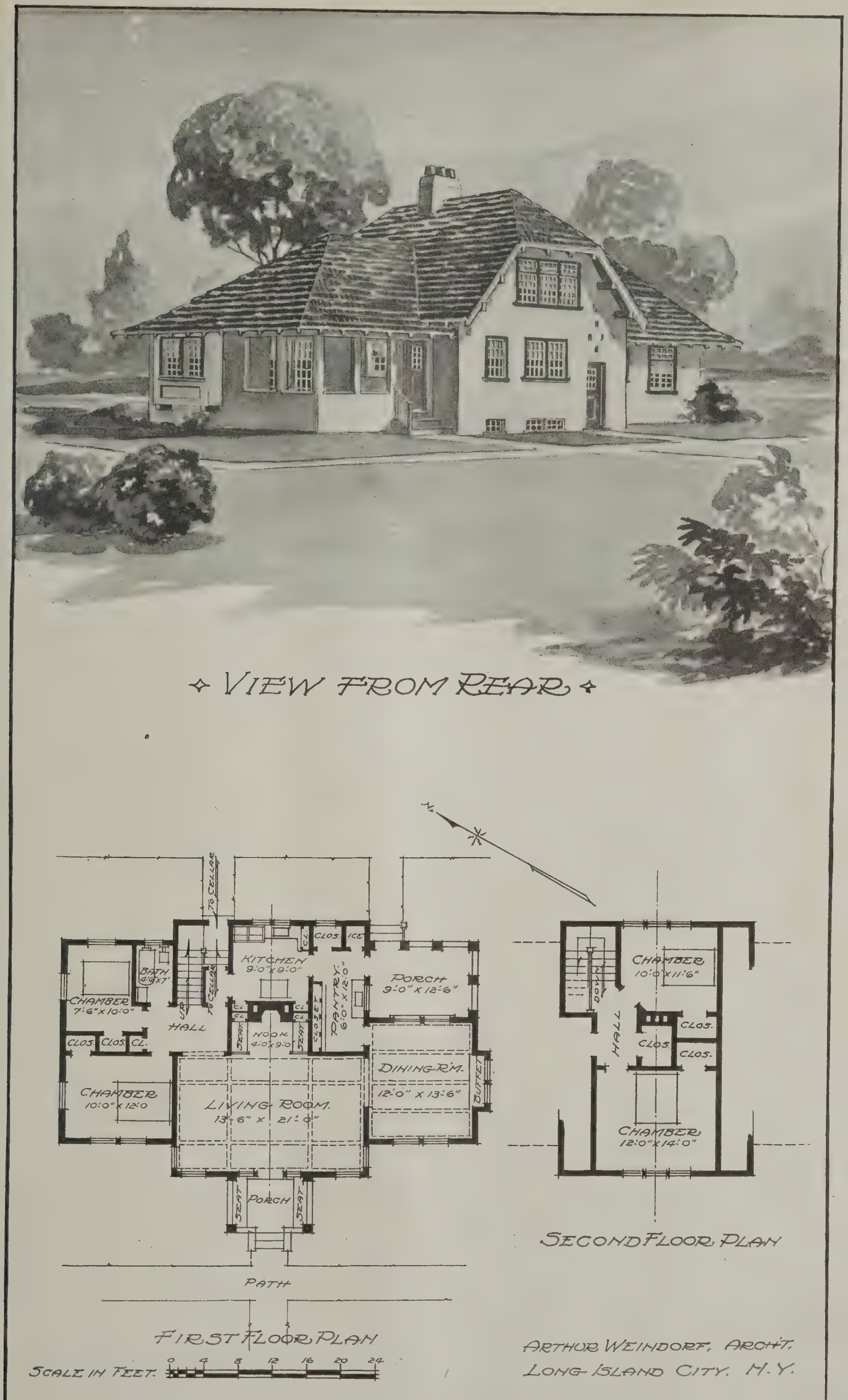
Exterior Stucco Work

The exterior stucco work will be of two coats throughout. The scratch coat will be at least ½ in. thick outside of the tile surface and will consist of one part cement, three parts sand and not more than 10 per cent. of the lime putty. The first coat will be applied under pressure and must be well scratched before it sets. The finish coat will be ¼-in. thick and for the cement color finish will be of one part cement and two parts clean sand. The stucco may be made water-proof by the addition of any one of the many damp-proofing compounds now on the market.

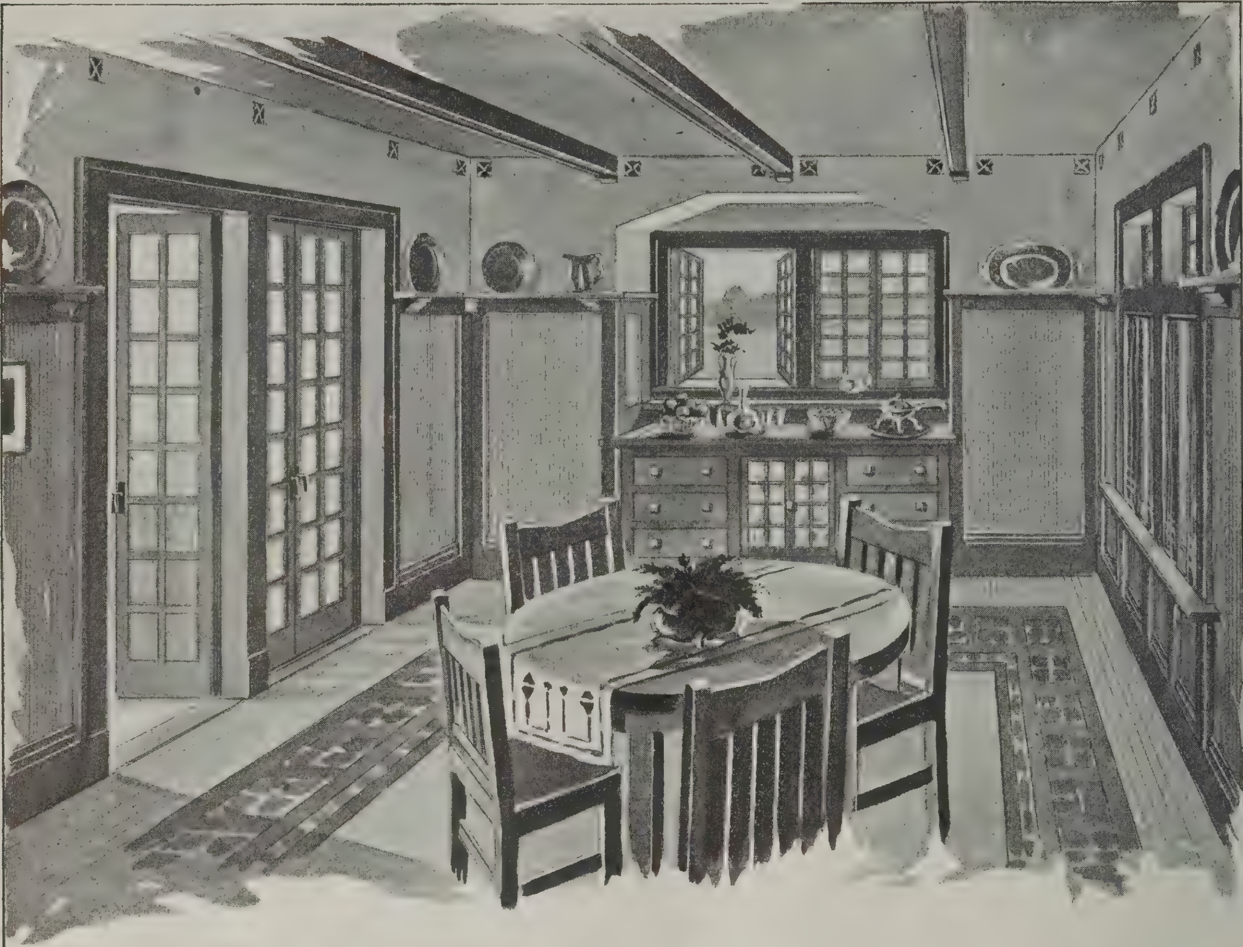
In the use of coloring materials care should be exercised in using only the best mineral pigments. For a rough sand finish the float is covered with burlap and the finish coat should be quite dry. "Dash finish" is secured by throwing the mortar for the second coat on the walls with a wooden paddle. For a "pebble dash" effect, the mortar should be rather wet when placed on the wall, after which the pebbles are thrown against it.

To produce a white finish use white cement and white sand or marble dust. Buff or yellow finish may be secured by using yellow ochre. A dark tone can be secured by adding lamp black to the cement.

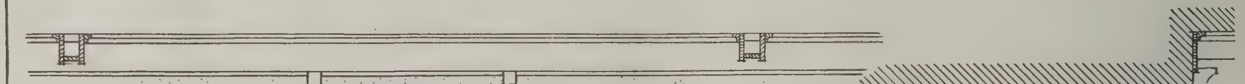
Plastering on the interior walls will be applied direct to the hollow tile. The interior partitions will be furred with pine lath to which the plaster is to be applied. All rooms are to be finished with



Floor Plans and Elevation of Cement-Coated House Forming Basis of Our Supplemental Plate



◇ VIEW IN DINING ROOM ◇



ELEVATION AND SECTION OF NOOK
◇ IN LIVING ROOM. ◇

ARTHUR WEINDORF, ARCH'T.
LONG ISLAND CITY, N. Y.

Interior View and Details of Cement-Coated House Forming Basis of Our Colored Supplemental Plate

King's Windsor cement, two-coat work, including the white finish. The living and dining rooms are to have a sand finish. All walls will be treated with a flat water-proof tint.

The bath room will have a floor of 1-in. hexagonal tile and a wainscoting 3 ft. high of 6 x 6-in. glazed tile with unbroken joints, not staggered, and with a round sanitary base and crown moulding.

The first and second tiers of joists are to be 2 x 8 in., placed 16 in. on centers. All interior partitions are to be built up of 2 x 4-in. studs, also placed 16 in. on centers. The studs around doors are to be doubled and all bearing partitions are to be bridged and have 4 x 4-in. plates top and bottom. Each tier of beams is to have cross bridging spaced every 10 ft.

The roof is to be covered with North Carolina pine upon which shall be laid roofing felt and this in turn covered with flat vitrified red unglazed tile.

The first story floor will be double and the second story floor single, all to be of North Carolina pine.

The outside trim is to be painted three coats and the under side of the eaves is to be varnished and left natural the same as the porch ceiling. The inside finish is to be filled and then sandpapered when dry and then given three coats of Pratt & Lambert's "Preservative." The floors are to be sandpapered and varnished and the cellar is to be whitewashed. The hardware is to be of a rustless iron finish selected by the owner.

The plumbing is to be of the best material and guaranteed for one year. The bath room will contain a wash basin, tub and water closet with fittings to be of nickel-plated finish. The kitchen shall contain two enameled iron laundry tubs, an enameled iron sink, also a combination coal and gas range with a 35-gallon galvanized boiler over it. In the pantry between the dining room and kitchen is also an enameled iron sink.

The house is wired for electric lighting and piped for gas, combination fixtures being specified.

The cellar is intended to contain a steam heating plant of a sufficient size to heat the building to 70 degrees in zero weather. All pipes and radiators exposed to view are to match the hardware.

The main portion of the house, including living room, stairs, kitchen, pantry and attic floor measures 23 x 30 ft. in plan by an approximate hight of 25 ft., which gives a total of 17,250 cu. ft.

The two ends of the house embracing the bedrooms, bath room, dining room and porch measure 13 x 24 ft., with an approximate hight of 17 ft. for each end, equals 10,608 cu. ft., or a grand total of 27,858 cu. ft. Figuring this on the basis of 23 cents per cu. ft. gives an approximate cost of $6,407.34.

Classified Estimate of Cost

According to the figures of the architect the estimate of cost of materials and labor are as follows:

Excavating and grading	$125
Masonry work, including concrete footings, hollow tile foundation walls and hollow tile exterior walls, brick chimney and fireplace, exterior stucco work and tile roof	3000
Interior plastering	340
Carpentry work, including lumber bill, mill work, labor, etc.	2100
Hardware	80
Metal work	110
Painting, including exterior and interior work, staining and tinting	270
Steam heating	320
Plumbing and gas fitting	340
Electric wiring and bell work	90
Combination gas and electric lighting fixtures	60
	$6835

It is to be noted that the above estimate of cost includes the contractor's 10 per cent. profit.

The cement-coated hollow-tile cottage or bungalow, as some might term it, here illustrated and described, was designed by Arthur Weindorf, Long Island City, N. Y., or care of *The Building Age*, 239 West Thirty-ninth street, New York City.

An English Method of Slating a Roof

Some Details Likely to Interest American Readers —Finding Number of Slates Required for a Roof

BEFORE commencing to slate a roof the first thing necessary is to sort, hole and trim the slates in one operation. The slates as they are being holed and trimmed are sorted out as thin, thick or medium. The reason for this is that slates of the same thickness being used by themselves, fit better one over the other and give the roof a better appearance. The thick slates are used at the bottom of a roof, the medium forms the greater part of the roof, and the thin ones are used near the top of the roof.

The slates are marked for holing with a gauge stick, which is about 18 in. long and has a nail driven through it near one end, with a thin piece of wood nailed on the other end, which forms a stop to press against the bottom edge of the slates, the point of the nail marking the position of the nail hole. The distance between the shoulder of the stick and the point of the nail is the gauge for holing and not for battening.

The gauge for holing and the gauge for battening are two different measurements. The gauge for battening, if the slates are center-nailed, is the length of slates minus the lap, divided by two. The gauge for center-holing is the gauge as before, plus the lap, and, sometimes, ½ in. is allowed for clearance of nails above the head of the slates below. For example, the gauge for battens for a countess slate, center-nailed, with a 3-in. lap would be

$$\frac{20 - 3}{2} = 8\tfrac{1}{2} \text{ in.}$$

The same slate for center-nailing would require the gauge stick to be set 8½ in. plus 3 in., plus ½ in., which equals 12 in.

Cutting the Holes

The holing should always be done from the back of the slate, that is, the smooth side. The reason for this is that the rough side of the slate, where the hole is made, will be splintered or hollowed out, so that when the slate is nailed on the roof, rough side upwards, the heads of the nails will be flush with the slates. The distance of the hole from the side of the slate should be about 1½ in.

Before commencing to lay the slates it is necessary to examine the roof and see that the battens are fixed to the correct gauge, and that the tilting fillets are in their proper places. It is the first batten that is important, for this batten must be fixed to suit the length of the undereaves slates, allowing for projection; then the center distance from this batten to the next will be the gauge as before mentioned. It may be stated that in fixing battens on a roof a gauge stick should be used; it is the quickest way, and simply impossible to go wrong. The length of the gauge stick is obtained after the two first battens are correctly fixed. Two pieces of battens are cut to fit in between the fixed battens, which simply repeats itself, the gauge being placed on the top edge of the batten, one each end of the roof, until the whole roof is battened.

Laying the Slate

In starting to lay the slates, says F. Pelling in a recent issue of the London *Building World,* the first course will be the undereaves. These will be shorter than the ordinary slates, and should project about 2 in. from facia board if the water discharges into an iron or zinc eaves gutter. The slates should not project too much, as it is then awkward to clean out the gutter at any future time. The undereaves course is sometimes formed by laying the slates the reverse or opposite direction to the other slates on the roof; this method saves a few slates, but it is not recommended. Generally, the length of slates for undereaves is length of slate minus the gauge or margin. The undereaves are laid to a line that is strained to the amount of projection desired. It should be noted that the undereaves slates are fixed the reverse side to the other slates; that is, they are fixed smooth side upward, whereas the other slates are always fixed smooth side downward. The reason for this is that the first course of eaves slates will have the smooth side resting on the smooth side of the undereaves, which gives a close-fitting and a neat joint. Each succeeding course of slates should be laid to a chalk line snapped according to the gauge, and in order that the slates should correctly half-bond the cut slate in starting every other course, the lap should equal one-half the width of a whole slate. In laying the slates, the different thicknesses must be observed for uniformity and appearance.

There are different sizes of slates in general use, but there is no hard and fast rule why one size should be preferred to another. It may be stated, however, that the steeper the pitch of the roof the smaller the slates, and for a flat pitch a large size slate is best. The reason for the selection of a large slate for a low-pitched roof is that water is more likely to soak underneath the slates, and a wide slate, half-bond, allows this to happen without any fear of leakage on to the roof timbers or the ceiling. If a small slate is used on a flat-pitched roof, with a minimum of lap, the chances are that heavy storms or driving rains might cause a leakage, as the joints of the small slates are closer together when compared with the large ones.

In reference to the lap, as the pitch of the roof increases the lap may decrease, and *vice versa.* Generally, the minimum of lap should be 2 in. and the maximum 3 in.

Finding Number of Slate Required

To ascertain the number of slates required for a roof, it is usual to divide the roof into squares of 100 ft. super, reduced to inches. The width and gauge of slates are multiplied together in inches, which, divided into the squares, as stated, gives the number of slates required. Roofs do not, as a rule, measure into exact squares, and so the writer prefers, for small jobs, to take the superficial measurement of the roof in feet, reduced to inches, as follows: A roof measures 20 ft. by 12 ft. 6 in., and 20 in. by 10 in. slates laid to a 2-in. lap are to be used. The superficial area of roof is 20 ft. × 12 ft. 6 in. = 250 ft. The length of slate, minus lap, divided by 2 is the gauge; 20 in. minus 2 leaves 18 in., which, divided by 2, gives 9 in. gauge. Therefore the number of slates required will be 250 × 144 ÷ 9 × 10 = 400 slates. This number does not allow for waste or undereaves.

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Northwestern Road Congress and Good Road Show

Seven states participated in the Northwestern Road Congress held in the Auditorium at Milwaukee, October 28 to 31 inclusive, the main floor of the building being occupied by exhibits furnished by manufacturers of road making machinery and materials for use in constructing permanent highways. The stage in the Auditorium was devoted to the exhibit of Milwaukee County, showing methods of constructing various types of hard surfaced roads and was arranged against a background showing a miniature concrete highway.

Among the exhibits of special interest to readers of *The Building Age* were those of the T. L. Smith Company, the Koehring Machine Company and the Badger Concrete Mixer Company, all makers of concrete mixers and the C. H. & E. Mfg. Company, makers of saw rigs, grout and plaster mixers, contractors' pumps, etc., all located at Milwaukee; Universal Portable Cement Company, Marquette Portland Cement Company and Chicago Portland Cement Company, all of Chicago, Ill.

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C. W. Jones, one of Chicago's well-known roofing men and prominent in association circles, died on October 19, after a four days' illness of pneumonia. He was connected with the National Roofing Co., and was 44 years old. For many years he was recognized as one of the leading men in the Chicago Builders & Traders Exchange, and up to the time of his death was one of the directors. On the day of his funeral 150 men from various associations were present, including a large contingent from the Exchange, of which he was a director.

Five-Room Bungalow of Oriental Design

Ordinary Materials Used to Work Out an Architectural Design Which Resembles Houses of the Mikado's Realm

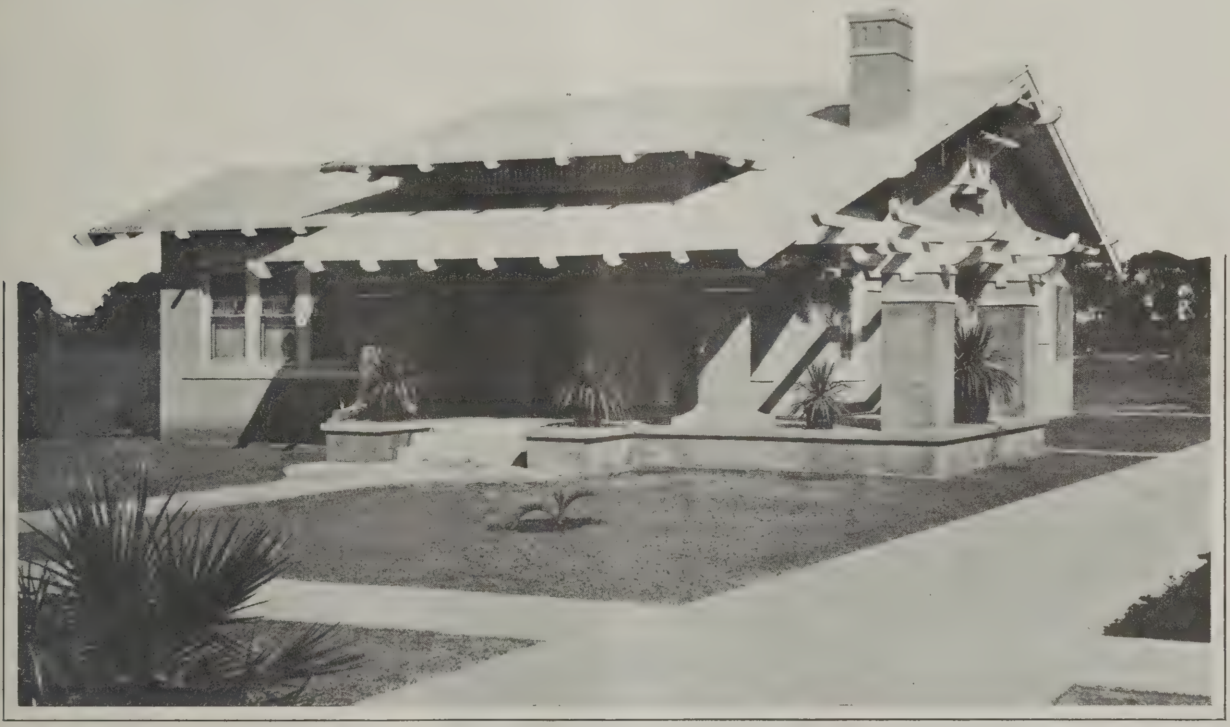
THE Japanese style of architecture is well adapted to the landscape of the southwestern states. The wide overhang of the eaves protects the windows from the scorching rays of the sun and the curved ridge poles and projecting rafters lend the necessary picturesque touch, which blends well with the background of mountains. In the house under discussion, which was recently erected at Mesa, Arizona, the purity of the Japanese style is rather carefully preserved.

The columns of the porch from the pergola might have been transported from a Mandarin's tea house and the small latticed windows nestling under the gables make one look for Fujiyama in the distance. The general spirit of the design has been well preserved in the overhang of the gables.

The main entrance hall opens directly from a veranda into the living room. The latter is provided with a stone arch fireplace surmounted by a mantel slab. Beyond the living room is the dining room, the most attractive feature of which is the treatment of the opening which affords communication between the two. The mullioned bay window, provided with a window seat, is another feature. A built-in buffet is placed at the left of the swinging door which leads to the kitchen. The paneled treatment of the walls and the Dutch plate rail add to the general effect.

The kitchen is provided with an ample cupboard, and the sink is placed directly beneath the double window, where it is well lighted—a point not always considered by the architect who plans the house. A door leads from the kitchen to a screen porch, and another to a screened room at the rear of the house which, if desired, may be utilized as a sleeping porch.

The bath room is so placed as regards the two chambers as to be easily accessible from them as well as from the living room. Each chamber has a clothes closet and the linen closet is conveniently placed as regards bath room and chamber.



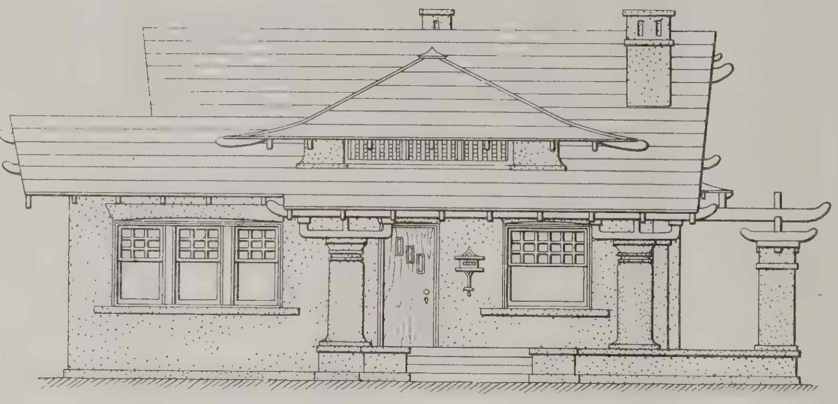
A Five-Room Bungalow of Oriental Design—L. V. Ashfield, Architect, Phoenix, Ariz.

All concrete for the foundation is composed of cement and river gravel in the portions of one part of the former to eight parts of the latter.

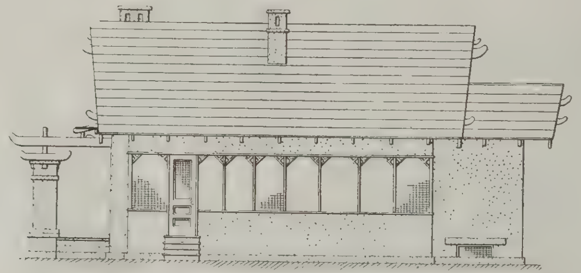
The front porch is provided with a 4-in. concrete floor and with steps of concrete 3 in. in thickness, composed of one part cement and seven parts river gravel and finished with a ½-in. top layer of one part sand and one part cement. The porch floor is jointed into blocks approximately 3 ft. square. The coping on the parapet walls of the porch are of cement as is likewise the fireplace hearth.

The fireplace is built of split boulders, all joints of which are laid in lime and cement mortar with two ⅜ x 2-in. arch bars over the opening and anchor bolts for the counter shelf. The back of the fireplace is lined with pressed brick laid in lime mortar.

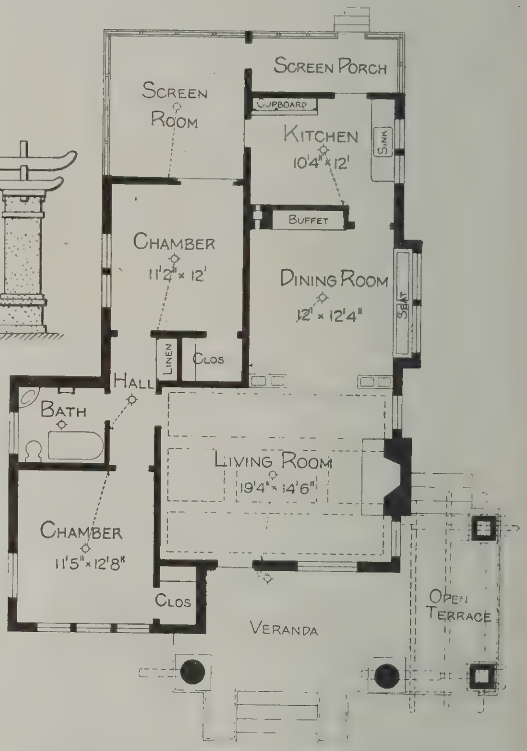
The framing lumber is of Oregon pine. The ceiling joists over the living room, dining-room and bedrooms are trussed with 2 x 4's. The rafters are spiked to the plates and tied together at the ridge with a 1 x 4-in. ridge pole. The floor joists are 2 x 6 in., spaced 2 ft. on centers and doubled under all partitions running parallel. The ceiling joists and partition studs are 2 x 4 in., placed 16 in. on centers. The studs have a single cap and sole piece, which are doubled around all openings and trussed over all openings running at right angles to ceiling joists.



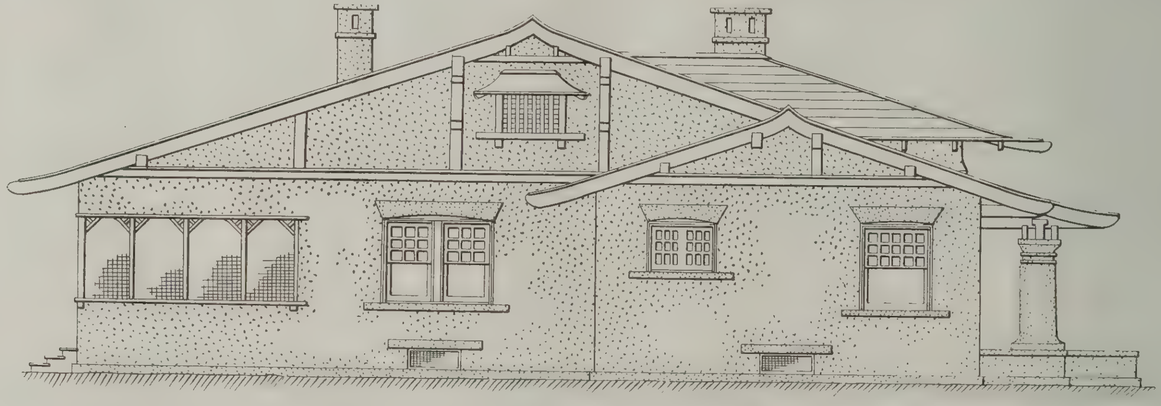
Front Elevation—Scale 3/32 In. to the Foot



Rear Elevation—Scale 1/16 In. to the Foot



Main Floor Plan—Scale 1/16 In. to the Foot



Side (Left) Elevation—Scale 1/16 In. to the Foot

A Five-Room Bungalow of Oriental Design—Plan and Various Elevations

The wood lintels over the openings in the brick wall are of 3 x 4-in. material and the gable end studding are 2 x 3 in., spaced 16 in. on centers. The rafters are 2 x 4 in., spaced 3 ft. on centers, except over the front porch, where the rafters are 2 x 6 in. The 2 x 8-in. wall plate is anchored with a ½ x 12-in. bolt every 8 ft. The 1 x 4-in. sheathing is spaced 9 in. on centers, except in the case of the front porch and the eave overhang, where 1 x 6-in. floor material is used.

All lumber for cornice is Oregon pine. The shingles are redwood, exposed 4½ in. to the weather.

The door frames in the brick wall are made with 2 x 6-in. Oregon pine rebated jambs and no sill. The box window frames are provided with 1 x 4-in. pulley stiles and back lining, and 1 x 5-in. casing, with 2 x 6-in. sills.

The screen porches are made with No. 16 mesh galvanized wire, with a ⅜ x ¼-in. screen mould over the joints on vertical studs, and ⅞-in. quarter round at top and bottom.

The finish floor of all rooms in the house is of ⅞-in. clear maple. The floor of the screen porch is of ⅞-in. No. 1 Oregon pine.

All interior finish is of slash grain Oregon pine. Interior doors are of Oregon pine 1⅜ in. thick, with vertical grain rails and stiles and slash grain panels. The front door is 1¾ in. thick, veneered on two sides with slash grain Oregon pine and with panels of bevel plate glass. The windows and sash are 1⅜ in. thick with rails and stiles of soft pine.

All walls and ceilings are plastered with a scratch coat of Douglas Fibred Hardwall Plaster, over which is applied one coat of the same material with the fibre screened out. The second coat in the bathroom and kitchen is of Douglas white cement, jointed in 2 x 8-in. squares.

All exterior plaster is applied in two coats in proportions as follows: For the first coat on wood lath Douglas fibred plaster extra rich in mixture is used and for brick work a mixture of one part cement to three parts fine sand. For the second coat where "slap dash" finish is used the mixture consists of one part cement, two parts fine sand and one part screened gravel, lightened in color by the use of a small amount of lime. For the second coat where a float finish is used the mixture is made up of one part cement and three parts sharp sand.

A Five Room Bungalow of Oriental Design—The Fireplace in the Living Room

All exterior surface woodwork, including shingles on the roof, is painted two coats and all floors and interior of screen porches the same.

All interior standing trim, except in the bathroom and kitchen, received one coat of stain and one coat of shellac, which was sanded lightly with steel wool and over which was applied one coat of interior flat varnish, except in the case of the living room and dining room, where one coat of interior varnish over shellac was used, finished with one coat of flat varnish. The bathroom, kitchen and pantry woodwork received four coats of lead, oil and turpentine, over which was applied one coat of white enamel. The finished floors received two coats of Acme quality "Varnotile" floor varnish.

Hot water in the kitchen is furnished by a 30-gal. Peerless combination hot-water boiler and gas heater. Hot-water connections are made with bath tub and lavatory.

In the kitchen is provided a 7-ft. portable wooden Woodstone drain board with right end return. In the bathroom is a 5-ft. 6-in. bathtub with 3-in. roll rim, made of cast iron and porcelain enameled, one Bartonia porcelain enameled iron lavatory with 8-in. back, of National Sanitary Mfg. Company's make and one Holbrook, Merrill & Stetson combination Volga Vitric washdown deep jet water closet. The fittings embrace nickel plated faucets of lever pattern, with china index.

All vent pipes are 2 in., except in the toilet, which has a 4-in. pipe. The waste pipes for the bathtub, lavatory and sink are 1½ in.

The cesspool, located 10 ft. in the rear of the house, is 6 ft. in diameter, 16 ft. in depth and lined with 4-in. bricks laid dry with ½-in. end joints, covered over with 4-in. brick, laid in lime mortar.

The house is piped for fuel gas and wired for electric lighting and bells.

The house was designed for W. A. Burton, at Mesa, Ariz., by L. V. Ashfield, architect, and was erected under the supervision of J. J. Garfield, superintendent, Home Builders, Phoenix, Ariz.

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Death of a Veteran Chicago Builder

John Rawle, a veteran in the Chicago cut stone industry and a prominent member of the Chicago Builders' & Traders' Exchange, was fatally injured by an auto truck on Thursday, November 12, and died on the following Sunday. He was 71 years old. He was engaged in the cut stone business for more than forty years and had retired after a most successful career when he met with the accident. Mr. Rawle was especially active in association circles. He was three times president of the Builders' & Traders' Exchange, in the years 1900, 1907 and 1908. In 1890 he was elected second vice-president, and in 1894 he occupied the treasurer's chair. His burial took place at Rosehill Cemetery, Chicago, on Tuesday, November 10, and among those attending was a delegation from the Exchange.

A Corner of the Dining Room Showing the Built-In Buffet and China Closet

Heating and Ventilating a Theater

Warm Air Supplied by Upward Currents from Mushroom Inlets Furnishes Supply for 600 People

THE rapidity with which moving picture theaters are multiplying in all parts of the country at the present time imposes upon the architect and builder a knowledge of requirements which in a sense are a little at variance with the general run of their work. The problems of heating and ventilation are most vital in connection with buildings of this nature and the architect, interested as he is in the details of successful installations, is likely to find much to command his attention in the practical example presented herewith, representing as it does a moving picture theater recently erected in the city of Cincinnati and which furnishes a good example of what is being accomplished in supplying the demand for adequate ventilation in public assembly halls. The Park Theater, as the building under consideration is called, was erected by the Northside Amusement Company, whose president, John J. Vogelpohl, is a plumbing contractor in the city named.

The entire building indicates the advantage of having a practical sanitarian in charge. The heating and ventilating system was especially designed by Walter E. Franz, a consulting heating and ventilating engineer of Cincinnati, Ohio, who arranged some direct radiation to take care of the heat losses from the walls and a fan system of ventilation blowing the fresh warmed or cooled air into the hall through a protected inlet device located under each seat of the auditorium.

The Excellence of the Equipment

With the accompanying illustrations and the description, the excellence of the equipment will be more readily understood. The building is about 40 x 160 ft. in size and two stories in height. The plan of the first floor, Fig. 1, shows that, at each side of the foyer, in which is the ticket booth, there are stores. At the end of the foyer is the entrance to the theater proper. This plan also shows, by means of dotted lines, the main concrete fresh-air duct, leading from the fan down under the center of the building, from which tile branches with outlets on the top lead to the mushroom fresh-air inlets located under each seat. It will be noted that at the far end there is a manhole cover by means of which this duct can be entered. This duct starts 4 ft. 6 in. in width and 3 ft. 8 in. in depth, and continues this size for over 40 ft., when it is reduced to a width of 3 ft. and a depth of 3 ft. until the end is reached. At the end two 8-in. tile pipes connect with 6 x 12-in. registers in the space reserved for the orchestra. This plan also shows the location of the radiators in the foyer, in the stores and toilet rooms and in the main audience room; also back of the stage.

The second floor plan, Fig. 2, shows the location of the direct radiators in the billiard hall, the operator's balcony, the office and the location of the moving picture operator's booth, which has a special 16-in. fan connected with a 16-in. galvanized sheet metal shaft terminating in a weatherproof ventilator on the roof. It also shows the location of a series of 24-in. sheet metal ventilators which extend through the roof with a weatherproof top. The direct radiators in the theater are served by means of an overhead system, a steam main rising from the plant in the basement to the ceiling of the second floor, where it is carried along the ceiling of the theater to a point where it branches. A main runs down each side, with branches to supply the radiators located, as shown in the first floor plan. The returns from these radiators are carried to the center of the building and back to the boiler room through the main fresh-air duct, utilizing the heat that otherwise would be wasted in maintaining the temperature of the air current in the duct.

The Mechanical Equipment

The longitudinal section, Fig. 3 on page 53, shows the mechanical equipment in basement and the run of the main air duct and of the steam heating main from the point where it branches on the ceiling of the second floor to supply the direct radiators in the theater. It also shows the special fan in the operator's booth and the ventilators connected with the ceiling of the theater.

The basement plan, Fig. 4, shows the location of the generator, the gas engine. This can be used to operate the generator; the generator may be directly connected with the fan or the fan can be run by the gas engine. It also shows the location of a 6-section 48-in. grate Ideal steam boiler, made by the American Radiator Co., which supplies steam not only for the direct radiators in the theater, stores, foyer, billiard room and toilet rooms, but also for the heaters used in connection with the fan. It will be noted from examination of the plan that two connections are made with the steam drum at the top of the boiler, one being carried directly at the top of the boiler, one being carried directly to the bank of Vento air heaters and the other running over to a point where it branches, the branch running to the back of the building supplying a riser carried to the ceiling of the second floor and shown in Fig. 2. The branch running to the front of the building supplies the various direct radiators in the other rooms as indicated.

The plan shows that provision is made for taking fresh air from outside of the building and passing it through a screen before it enters the duct supplying the heater passing through the fan and being discharged in the main fresh-air duct.

Fig. 5 is a view of the mechanical plant in the engine room, showing in the foreground the dynamo belted to the gas engine, at left the air heaters with the steam connections, and at right the thermostatic apparatus for temperature control. The power plant consists of a 40-h.p. 4-cycle 2-cylinder Reeves gas engine operating on natural gas, belted to a 20-kw. 110-volt D. C. generator from one flywheel. It also drives the ventilating fan for the theater by means of a clutch pulley at the end of the engine shaft.

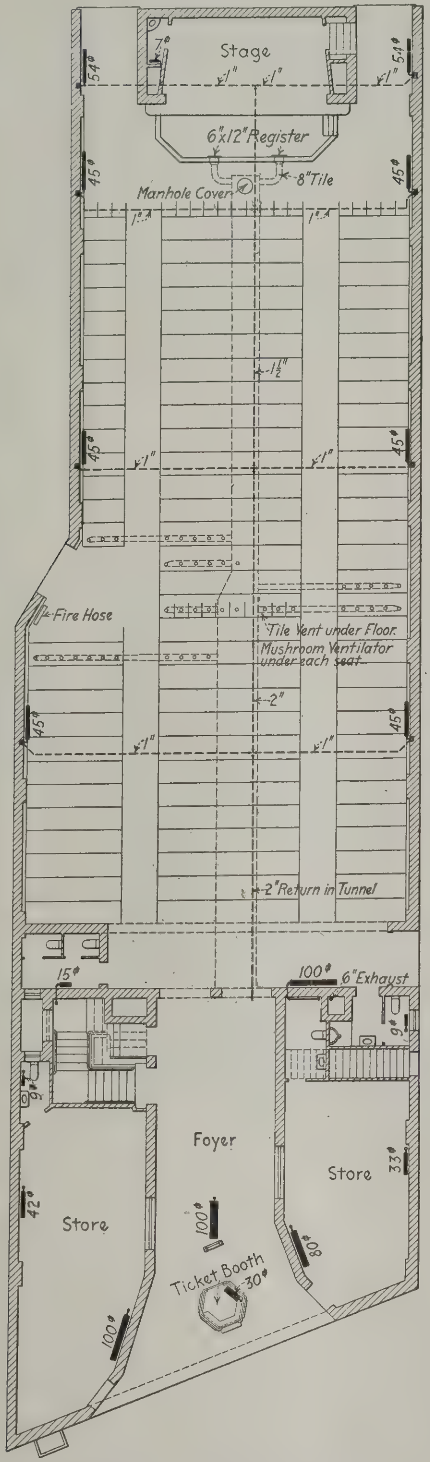

Fig. 1—Plan of First Floor, Showing Run of Fresh-Air Ducts with Mushroom Inlets Under Each Seat

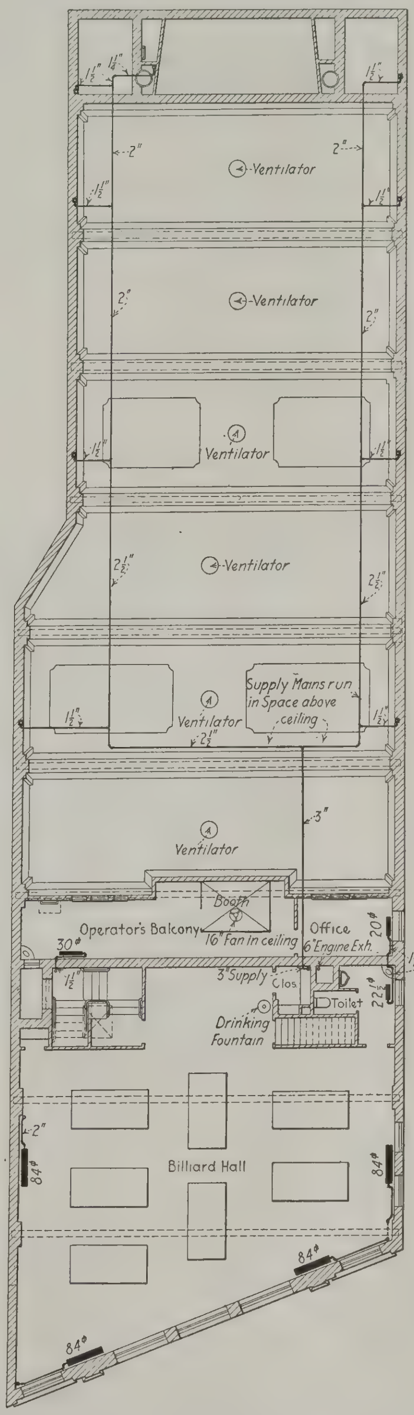

Fig. 2—Plan of Second Floor, Showing Operator's Booth with Special Exhaust Fan and Ceiling Ventilators

Heating and Ventilating a Theatre—The Two Floor Plans

The steam boiler is in a room adjoining the engine room and is set in a pit 24 in. below the level of the floor to keep the water line well below that maintained in the Vento hot-blast sections. The ventilating system draws air from a light shaft at the side of the building through three banks of Vento cast-iron heating sections and then through an improved type Sirocco fan, made by the American Blower Co., Detroit, Mich., discharging the air into a concrete tunnel under the theater floor. Branch ducts made of salt glazed vitrified sewer tile and shown in Fig. 6 distribute the air from the tunnel to each of the 600 seats of the theater and to the orchestra pit. Under each seat the air is discharged through an adjustable mushroom ventilator of the type used by the American Blower Company. The air passes out of the theater through six large grilles in the ceiling and then to the roof ventilators, as shown in the elevation.

System of Temperature Regulation

The system has been designed with a view to maintaining a temperature from 68 to 72 deg. when there is a temperature of 5 below zero out of doors. To aid in this accomplishment the Powers system of temperature regulation was installed. In addition, the direction radiation is controlled by a thermostat placed in the auditorium. This thermostat operates a valve on the line supplying the steam to the riser, and from there to the attic space where the supply main is located. Diaphragm motors operate the dampers in the connections to the roof ventilators, closing them when it is desired to keep the cold air from entering the theater when the fan is not running. A flexible connection made of cotton belting is inserted between the fan and the concrete tunnel to prevent the fan from transmitting vibrations and noise to the auditorium. The amount of air handled by the system is regulated by a main damper in the intake duct, which is held in position by a lever and a quadrant outside the duct. The lever can be adjusted to any desired position and then locked by means of a padlock. A similar damper with a locking arrangement is located in the by-pass under the heating sections. In cold winter weather the by-pass damper is closed, so that all the air passes through the heating sections. The direct radiation placed in the auditorium furnishes the heat to supply the loss of heat due to exposure. The six radiators on the side walls present a neat appearance and are of the one-column Peerless pattern, mounted on steel brackets. Other radiators set on the floor are furnished with high legs to make it easy to clean beneath them. The direct radiatiors in the auditorium are supplied by means of concealed drop risers, as shown in the plans and elevation and the returns drop down through tile ducts to the tunnel, where the return main is located. All the direct radiation is connected on the one-pipe system. The blast sections are connected with both supply and returns.

The Capacity of the Fan

This is the equipment that has been installed. With 600 people in the theater, the fan has a capacity to deliver 21,600 cu. ft. of air per minute in the summer time, or about 37 cu. ft. per minute per person, an excess of the provisions made in the best class of school heating and ventilating systems. Under winter conditions, when the air must be raised in temperature, the fan delivers 15,120 cu. ft. of air, or 26 cu. ft. of air per minute per person, with the large duct preserving a large size throughout its whole length to eliminate friction and loss of pressure. This provision is practically equal to the best school requirements. The equipment will change the air in the auditorium every 4 min. in summer and every 6 min. in winter.

Cost Figures on Equipment

An interesting feature of the description is the statement that the heating, ventilating, temperature regulation systems, inclusive of the concrete tunnel, cost approximately $4,500. The concrete tunnel cost $400; the gas engine, including belt, cost $1,847; the generator and switchboard, $420; the electric wiring, exclusive of the generator wiring, cost $850. The mechanical equipment enables the company to enjoy control of its own lighting system and to provide its tenants in the stores and its patrons in the theater a brilliant illumination and the wiring system has been so designed that from one central switchboard control of fresh-air dampers, heating dampers, heating valves, fans, lighting systems, etc., can be obtained at will. To these provisions for the ventilation of the theater both in the winter and summer, as careful provision has been made for the sanitary equipment. The toilet rooms are not only conveniently located, but are equipped with the best grade of modern plumbing fixtures, with both the drainage and ventilating system of the most approved design. This part of the equipment was designed by Mr. Vogelpohl, whose company was contractor for the work.

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The Use of Lime in Mortar

The use of lime as a binding material for mortar originated in the remote past. It is probable that some savages when using limestone rocks to confine their fire noticed that the stones were changed by the action of the heat, says a report of the U. S. Geological Survey. A passing shower may have slaked the lime to a paste, and they discovered that the paste was smooth and sticky and was a better material than clay to fill the crevices in their crude dwellings. From this discovery it was but a step to add sand to the paste in order to produce a mortar.

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The Scarcity of Apprentices

According to a recent issue of the London Stone Trades Journal the dearth in trades' apprentices at the present time is a serious factor in the industrial life of Great Britain. The authority in question says:

For instance, both Perth and Dundee can each boast one apprentice mason only, and soon, no doubt, the breed, apparently, will be extinct, whereas twenty years ago there were something like forty apprentice masons in Perth, and over a hundred in Dundee.

In fact, less than a dozen years ago, in one builder's yard in Perth, there were working no fewer than 18 apprentices. During recent years, however, the building trade has been more or less under a cloud, and the substitution of brick for stone in the erection of buildings has also contributed to the decay in the mason trade proper, and the consequent difficulty in finding lads to apprentice themselves to a trade which has of late been laboring under various difficulties.

Notwithstanding that apprentice clerks and youths in offices generally are much worse off from a pecuniary point of view, the fact remains that the modern educational system tends to drive youths into offices rather than into trades. The evening continuation classes and the secondary education facilities are no doubt largely responsible for the disinclination of young people nowadays to turn to common artisan work as a life vocation, and, incidentally, the technical education now cheaply afforded is causing youthful ambitions to gravitate in the direction of skilled engineers, mechanics and electricians, rather than to look to the building trades, highly paid as the journeymen in these now are, as a satisfactory occupation.

In the country districts emigration to the Colonies and to the populous centers at home contributes largely to the dearth of apprentice masons, joiners and others in the building trade.

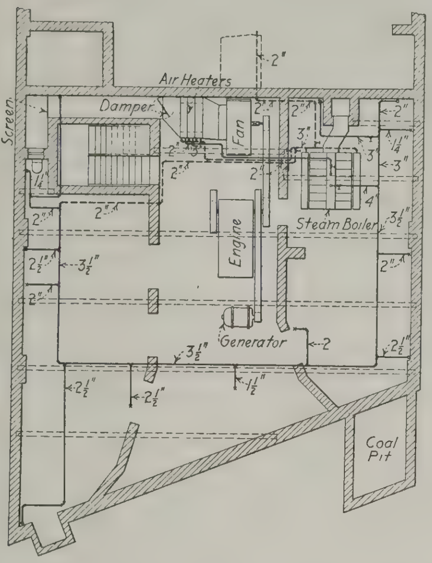

Fig. 4—Basement Plan Showing Location of Boiler, Air Supply and Heaters' Fan, Gas Engine, Dynamos and Run of Steam Piping

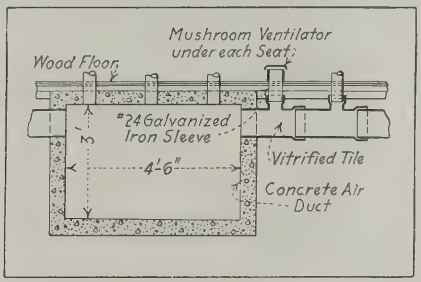
Mushroom Ventilator under each Seat
Wood Floor
"24 Galvanized Iron Sleeve
Vitrified Tile
4'-6"
Concrete Air Duct

Fig. 6—Section of Fresh-Air Main with Tile Branches to Inlets Under Seats

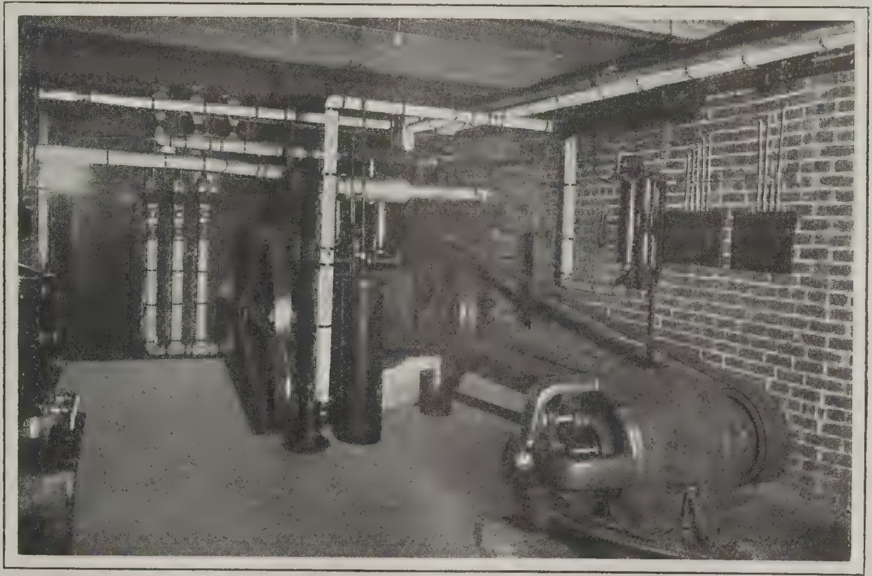

Fig. 5—View of Mechanical Plant Showing Dynamo Belted to Gas Engine and Thermostatic Apparatus on the Wall at the Right

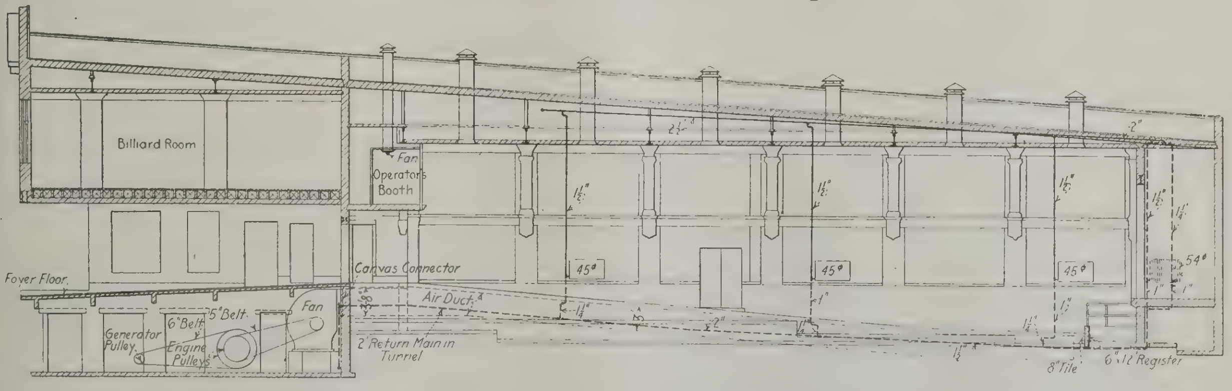

Fig. 3—Elevation Showing Mechanical Equipment and Main Fresh-Air Duct Leaving Mushroom Inlets Under the Seats and Exhaust Ventilators in Ceiling

Heating and Ventilating a Theatre—Various Details of the Mechanical Plant

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Stone Production in 1913

The value of the stone production in the United States in 1913 reached a total of $83,732,995 according to E. F. Burchard, of the United States Geological Survey. This is an increase of $5,539,775 or 7 per cent. over the former record-breaking figures for 1912.

CORRESPONDENCE

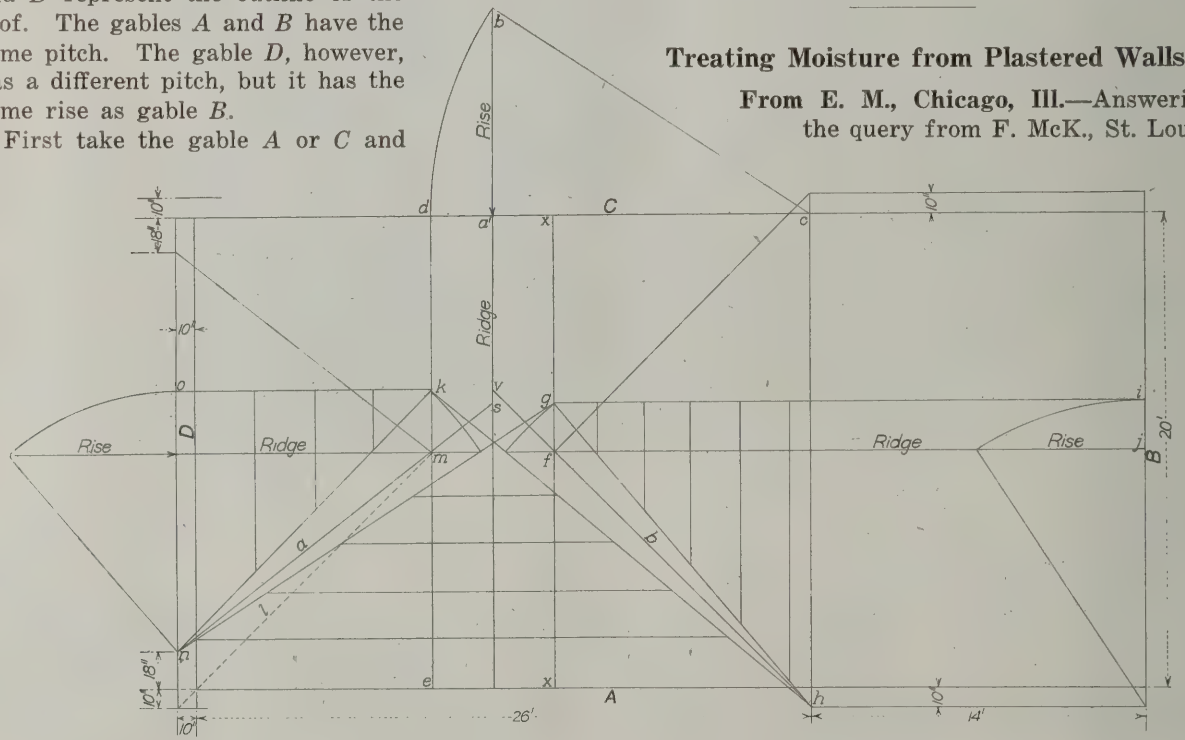
A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

Obtaining Lengths of Rafters in Roofs of Unequal Pitch

From W. G. S., Phoebus, Va.—I have seen many diagrams of roof framing showing how the lengths of all the rafters were obtained, but I have never seen a sketch that covered all the conditions contained in the one which I present herewith. I will not take up the matter of the different cuts and bevels for the reason that the real problem lies in valley *a* and in the lengths of the jacks on either side. So far as I know this diagram is original with me, for I have never seen one similarly illustrated. If there is any other method by which valley *a* and its jacks can be drawn I shall be very glad to have it explained.

Referring to the accompanying diagram, *A*, *B*, *C* and *D* represent the outline of the roof. The gables *A* and *B* have the same pitch. The gable *D*, however, has a different pitch, but it has the same rise as gable *B*.

First take the gable *A* or *C* and with *a′* as the center, draw *a*-*b* and connect *b* with *c*, which gives the true length of the common rafter. Now swing *b* to *d* and draw *d*-*e*. It will be seen that the line *x*-*x* is the same as *d*-*e*. Use the same process on gable *B* as on *C*. It will be noticed that *f* represents a point where the ridge of gable *B* intersects with the main roof. Draw *f*-*g* and connect *g* with *h*, which gives the length of the short valley rafter.



Obtaining Lengths of Rafters in Roofs of Unequal Pitch—Contributed by "W. G. S."

Lines drawn from *g*-*i* to the line *g*-*h* give the lengths of the respective jacks.

Extend *f*-*j* and swing *g*-*h* until it cuts the line *f*-*g*. Then draw *h*-*k*, which gives the length of the long valley rafter.

The dotted line *l* is drawn to locate the point where the ridge in the gable *D* will intersect the main roof. It is found to be at *m*. The rise in this gable, as has already been pointed out, is the same as in gable *B*.

Using the preceding method, it is found that *k*-*n* is the length of the short valley rafter and *g*-*n* the length of the long valley rafter. Lines drawn from *k*-*o* to *k*-*n* give the length of the jacks on that side, while lines drawn from *g*-*n* to *g*-*x* give the lengths of the jacks on the right hand side of the valley *a*. Lines from *k*-*h* to *k*-*e* give the lengths of the jacks on the left hand side of valley *b*.

The points *s* and *v* represent the respective places at which the valleys *a* and *b* strike the main ridge.

Treating Moisture from Plastered Walls

From E. M., Chicago, Ill.—Answering the query from F. McK., St. Louis, Mo., in the September issue I would say the plastering contractor should not have used salt in his mortar. It is about time salt be abandoned for mortar and concrete as it is really of very small benefit and the harm done greatly overbalances the little benefit derived by using it. The only way to stop the sweating is to remove the plaster and replaster the walls. This I know from personal experience in a bad case. Numerous expedients are tried and it has been claimed by some men that they stopped such trouble by waiting until the middle of summer and then drying the walls as thoroughly as possible, usually by closing the rooms and heating them. When the walls are dry, size with varnish cut with turpentine or benzine to which add a little plaster of paris. Such a surface should then be either painted or papered. Soap, alum or glue may be used for sizing walls to be painted provided no dampness has manifested itself but for walls which have shown dampness only varnish sizing will do.

Some Features of Bungalow Construction

From Builder, Redford, N. Y.—It will be necessary for "E. H. B.," Brooklyn, N. Y., to make his brick bungalow wall when plastered, as thick as the frame wall when plastered is drawn plus six inches. The inside of the brick wall will carry all the load when properly bonded. One mistake he may be making is this: It may require a brick and a half or two bricks to equal the thickness of his prepared frame wall as drawn, in which case he may not be able to make his brick building more than 8 inches longer than the frame plan. He may be obliged to get special brick.

It is impossible to say how thick the foundation wall and base should be without seeing the ground. An 8-in. brick wall is unsafe for anything above a few feet, as bonding cannot be properly done.

By making the roof flatter the rafters he has on hand will answer the purpose. He can also increase their length by putting in a fair sized ridge pole.

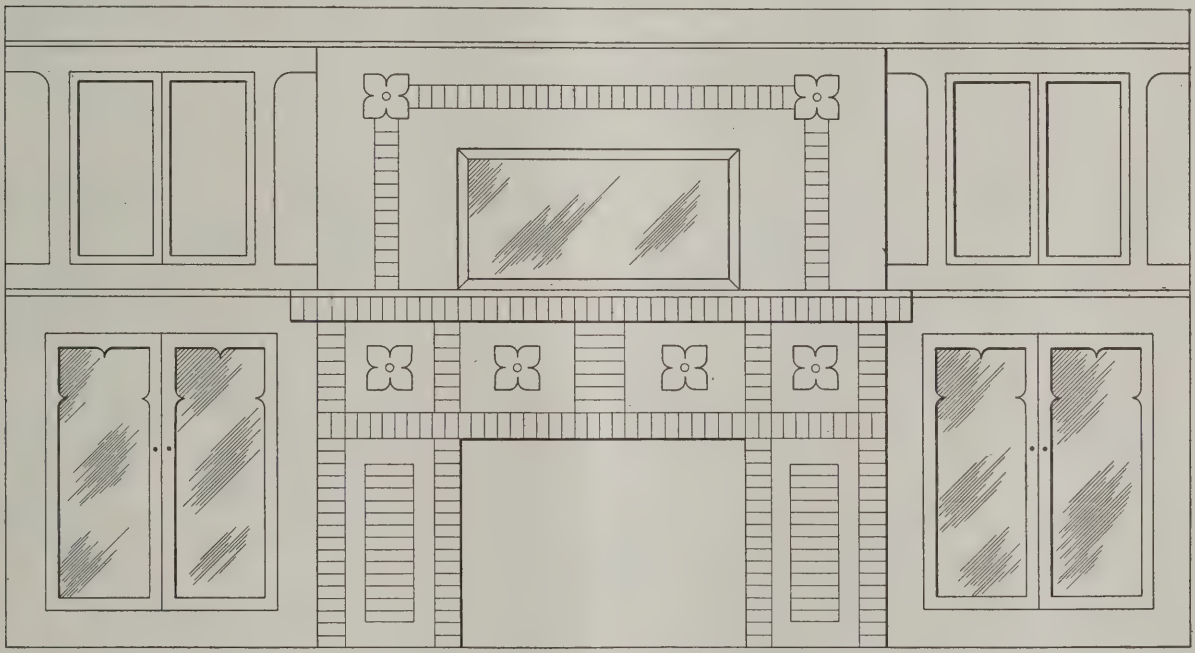
Construction of a Drum Sander

From D. D., Drayton, Ont.—I have been a subscriber to *The Building Age* for 18 years and have bound all the numbers of the paper. I find them a great store house of information.

I would like very much to have some of the readers furnish for publication a plan and description of a drum sander for use in a small woodworking shop to sand casings, base, stair treads, risers, strings, etc. I think the drum would do about 2 ft. in diameter. What speed should it run, and what is the best means of securing the paper to the wheel? What size should be the wheel?

Design for Fireplace and Bookcases

From LaVerne F. Gillett, Royal Oak, Mich.—I am sending herewith a drawing showing design for fireplace and bookcases which may be of interest to some of the readers of *The Building Age*. The design is for the pastor's study in a church. The rows of soldiers would be built of dark red brick; the rosettes would be dark tile or terra cotta, and the panels would be of slightly lighter colored brick. The woodwork would be dark fumed oak built flush with the fireplace milled to sketch.



Design for Fireplace and Bookcases—Submitted by La Verne F. Gillett

How to Make Blue Prints

From A. R. Fair, 79 High street, Bradford, Pa.—In the October issue of this magazine "R. E. B.," Clarksville, Tenn., asks how to make blue prints, as he appears to have had considerable trouble in producing those which were satisfactory. I have never had any trouble in this line so I give him the following formula and directions:

The first essential is a good tracing, made on good tracing cloth or tracing paper. A good brand of India ink must be used and the lines should be good and strong.

The next necessity is a good printing frame with a good plate glass as good prints cannot be made with ordinary window glass. The back of frame must be straight and lay perfectly flat to the glass and a good felt must be used between paper and back of frame.

It takes from 3 to 10 minutes for printing, depending on the strength of the light. If printed too long the lines will not be a pure white; and if not printed long enough the blue will not be dark enough. This is best determined by using a small strip of paper for a test, so as not to spoil a large sheet. The paper should always be handled in as dark a room as possible when out of the frame until partly washed at least, and should be washed with the print side down until nearly done so that the light will not strike the print. It does not matter what kind of a washing tray is used as long as it has a flat bottom and is clean. I use one made out of ½-in. boards.

One can buy blue print papers so cheap that it is not worth while to bother to make it. Good paper can be bought in ten-yard rolls for 6 cents per square yard, and if "R. E. B." will send me a self-addressed stamped envelope I will send him the names of dealers of this paper as no doubt the editor does not wish to use this column as an advertising medium.

If, however, any one does want to make his own paper, use some good grade of white paper. Then dissolve 1 oz. avoirdupois of ammonia citrate of iron in 6 oz. of water, and in a separate bottle dissolve the same quantity of potassium ferricyanide in 6 oz. of water. Keep these solutions separate and in a dark place or in opaque bottles.

To prepare the paper, mix equal parts of the two solutions and with a sponge spread it evenly over the surface, but not necessary to soak the paper. Let the paper remain in a horizontal position until the chemical has set on the surface, which will take but a few minutes, then hang the paper up to dry. This must be done in a dark room.

Following these directions, I can't see how anyone can fail to make good prints.

From C. A. Wagner, Architect and Builder, Port Jervis, N. Y.—In reply to "R. E. B.," Clarksville, Tenn., I desire to say that the age of chemicals does effect their usefulness after they are dissolved and they should not be used after they are three to five weeks old. They should be kept in dark colored bottles in a dark place and it is not well to save any of the solution after once it is mixed, as it will not keep.

Use a sponge for applying the solution to the paper, but do not *saturate* the paper. Put it on the paper by moving the sponge in one direction and then wipe off the surplus in the opposite direction.

Coat the paper in a dull light or lamp light and hang it up to dry. The paper can then be rolled in a bundle but should be kept in a dry, dark place. After the paper is coated it will keep for four to six months with good results. Partial exposure does not affect it in coating or printing. Roll the print when taking it from the printing frame so as to exclude the light until you have placed it in a bath of clean water, then unroll it at once. Place the print side down in the water first, then afterwards it can be turned face side up and examined. Give it a thorough washing and plenty of water for about five or eight minutes, then hang it up to dry, at which time the sun will not affect the print.

The work may be done either in-doors or out in the open, but a subdued light should be used when placing the paper in the frame and when taking it out. I have no trouble whatever when making prints, washing and drying in this way. I use bond or linen paper which may be bought of any printing establishment. It is a good, serviceable paper.

If "R. E. B." has any more trouble I shall be very glad to advise further if he will state just what he desires to know in the way of blue print making.

Hints to Building Contractors

From E. M. Keppel, Youngstown, Ohio.—I am writing these few hints to contractors as a result of several years experience in connection with the plan department of a large architect's office. I have found how much first impressions count for or against a contractor, and these suggestions are to make those impressions as favorable as possible.

First of all, it is very nearly as hard for a contractor to get his first plan to estimate from certain architects' offices as it is for a struggling young author to sell his first manuscript. This impresses the contractor as the height of injustice and he makes scathing remarks that these certain architects are members of rings and that a new man has no chance. But he is wrong, as a little thought will show.

An architect, first, last and always, owes allegiance to the owner. He is morally obligated to furnish the owner the most perfect and complete job possible. He cannot do this with incompetent men, and he doesn't like to take a chance. He is responsible for the building and he is sure to select contractors to estimate his work in whom he places perfect confidence.

So, it follows, one must be extremely careful of ones conduct in applying for an opportunity to figure. I will set down a few rules that in my own experience have helped or hurt the contractor.

1—Do not boast of the work you have done. You may speak of several contracts you have executed as a reference, but do not make the remark, "I do better work than any other man in the city."

2—Do not track the office with mortar, loam or other dirt. This is a little thing but it makes a difference.

3—Have a neat personal appearance.

4—Do not say, "Mr. So-and-So (a rival architect) lets me figure his plans, I think you could do the same."

5—Do not speak in the same tone that you use to your foreign labor. Modulate your voice.

6—Do not have the expression, "Estimates Cheerfully Furnished" on your business cards. Nine contractors out of ten are willing to estimate any work that they may be asked to figure and the statement is entirely superfluous.

7—Do not have the words "Architect and Builder" on your card. This alone will eternally damn you in any ethical architect's eyes. It is a combination with which he has no sympathy.

8—Do not offer him a cigar. If he is a man worthy of doing business with he can buy his own cigars. Besides, we all have our favorite brands.

9—Do not try to trick the architect. When you say, "Have you any work to figure?" and he answers "Not at present" do not reply with the question, "How about that Jones job?" This he will immediately recognize as an attempt to catch him in a lie. It will discredit you.

Besides these nine rules I have given, there are several other things that are well to bear in mind.

If the architect is reluctant to let you figure a certain job, do not press him. It is very probable that the owner has given him a list of contractors that he wishes to submit estimates and the architect is powerless to let you figure even if he should so desire.

If you should be allowed to figure do not deluge him with suggestions as to the betterment of his plans. Remember he is an architect and you are not.

Return the plans within the specified time; don't be a plan hog.

Do not try to mislead him as to the class of work you have been doing. It is ten to one that he knows your record from A to Z before you enter his office.

Do not cringe and act apologetic, neither should you be too independent. There is a happy medium.

Safe Construction of Church Trusses

From W. J. B., Wichita, Kan.—I am engaged in building a church which is to have a dome-shaped roof supported by six wood trusses of the Howe type. The accompanying sketches show three styles of trusses of which there are two each. The drawings show the maximum dead and live loads which I have estimated the trusses should support. I would like to learn through the Correspondence Department of the paper, or preferably from Mr. McCullough, if the construction shown in the accompanying sketches is safe and sufficient to carry the loads indicated.

By the architect's specifications the lower and upper chords of the trusses are to be built up of 1¾ in. long leaf yellow pine joists 26 ft. long or under, lapping each other about 6 ft., and with two ⅝ in. bolts at the side of each spliced joint, the whole chord being bolted every 28 in., staggered.

I doubt whether the lower chords will hold the tension stresses, especially the member at the bearing of truss "B" on truss "A." If I can obtain an engineer's opinion on this matter I shall very greatly appreciate it, and I have no doubt that there are other readers who may be interested.

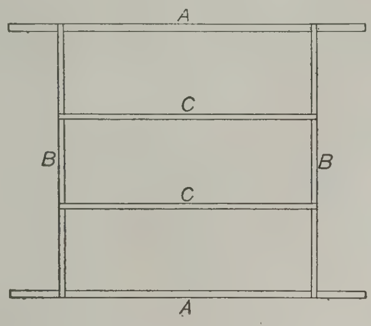


Fig. 1—Plan Showing Arrangement of the Trusses

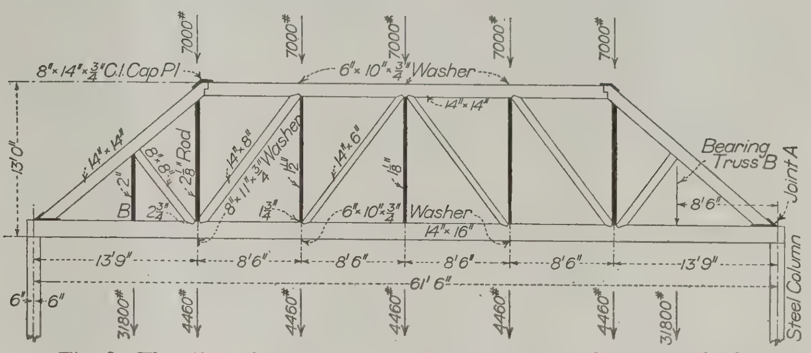


Fig. 2—Elevation of Truss "A" Showing Dimensions of Various Members

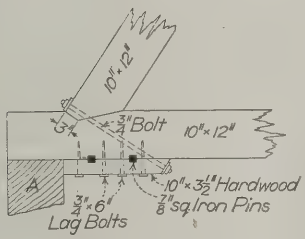


Fig. 5—Detail of Joint "A" in Truss B—Scale ¼ In. to the Foot

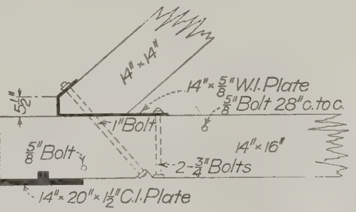


Fig. 6—Detail of Joint "A" in Truss "A"—Scale ¼ In. to the Foot

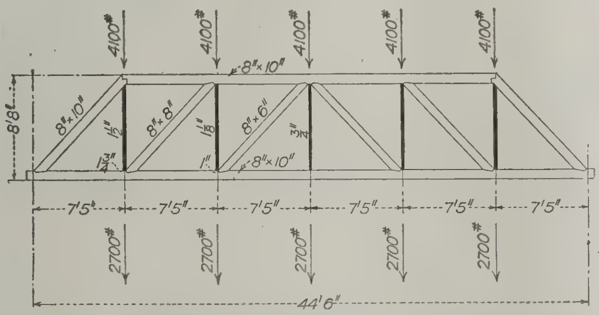


Fig. 3—Elevation of Truss "C"

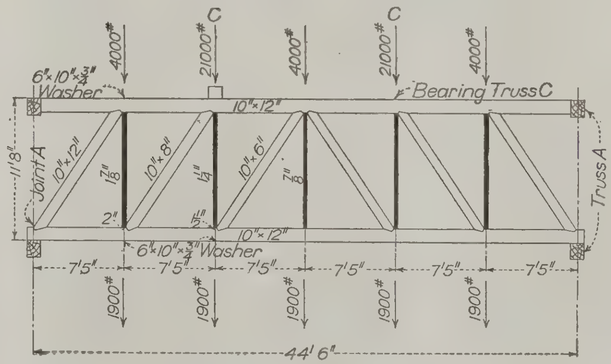


Fig. 4—Elevation of Truss "B"

Safe Construction of Church Roof Trusses—Sketches Submitted by "W. J. B.," of Wichita, Kan.

Remodeling an Old Stone House

From Subscriber, Council Bluffs, Iowa.—I have been interested in the problem of "V. S.," Yeagertown, Pa., presented in the October issue of the paper, for to my mind an old stone house is the most beautiful old house on the market to-day. I would, therefore, like to make a few suggestions which may assist him in rendering the changes he desires.

The wall out of line can be held where it stands by placing 6 x 6 in. timbers through the wall on either side of the bulged portion and wedge them well on top of uprights about 4 ft. apart. If the bulge is not too bad perhaps a prop with a good footing of blocks in a slanting position may hold the upper portion while the wall is relaid where out of line. The correspondent can reinforce the footing by placing some old pieces of iron rods in the concrete. In my opinion concrete 10 in. thick will serve the purpose without any reinforcement. The new footing can be put in 3 ft. or 4 ft. at a time.

In remodeling according to the correspondent's sketch I would suggest that he make the parlor the dining room, reverse the stairs so that the pantry and passageway will be under the landing between the kitchen and dining room; remove the present partition between the hall and living room, making one good room, or at least remove all but one foot on each side of the present opening.

Build a gable roof over the house and extend it over the porch Swiss style with a flat roof dormer on one side, if not both. It should extend over the sides and over the porch and opposite side 4 ft. and over the gable sides 2 ft. 6 in. The porch should be at least 12 ft. wide and 14 ft. long with round cement posts finished "rough-cast" 20 in. in diameter at the bottom and 16 in. at the top. The cement floor should be reinforced with ½ in. rods running both ways and placed 8 in. apart. The railing should be of brick with a cement cap 4 x 12 in.

Location of Registers and Furnaces

From J. F. H., Indianapolis, Ind.—In my opinion the article appearing on page 41 of the September issue of the paper should be qualified to a considerable extent before it is accepted as a building classic. The remark "the right place for the furnace is that which will call for the shortest run of piping to all the registers," should be supplemented by a vigorous statement as to the proper place for a register in each room.

Aside from the location of registers to suit the furnishing of the room, a little attention at least might be paid to the position of the register so as to warm the room. Every person who has operated a hot-air furnace in cold weather knows the impossibility of forcing room circulation against the prevailing wind currents outside of the building. For instance, the writer is now living in a house in Indianapolis with a southwestern exposure to streets on those two sides of the building. The living room has windows and outside door on its west side, while the register is placed in the extreme eastern end of the room, right against and almost under a wide arch leading to the dining room.

Such location of a register is almost criminal—and added to the fact that there is an inside circulation, the cold air being taken from a point within 3 ft. of the misplaced register above noted. The writer would be greatly pleased to see inserted in the criminal code an ordinance forbidding the location of registers on the lee side of a room, and the placing of a furnace on the side of a structure opposite to that from which the prevailing winds come. And there should also be included in said ordinance a clause making it a criminal offence to install an internal return system of hot air heating. The air supply should in all cases be taken from outside the building. Failure to do this is a direct bid for larger doctor's bills and the great detriment of the health of those who may have to live in a building where foul air is returned to the furnace for reheating.

The only argument in favor of an internal air-supply system is that of economy in the use of fuel. It certainly requires less coal to heat the air over and over again than it does to heat the same quantity of pure fresh air from outside of the building, therefore the economy in fuel is directly to be tabulated against the increased physician's bills and the increased ill health of the family.

The steam heating engineer uses every endeavor to place radiators beneath or in front of windows and along exposed sides of rooms, where the greatest cooling effect is felt from outside cold and winds. Why then should not the furnace man follow the same practice and provide an installation which will truly warm the rooms of a building?

In my case, I cannot change the location of the registers. They are criminally placed, and must stay there, but I can and will cut a hole in the galvanized steel air-supply pipe, and take some fresh air from the cellar. Then I will place the cellar window on hinges, control the sash by means of wires from the living room floor, and be able to obtain some fresh air at least. The cellar is as clean as any room in the house as far as septic conditions are concerned and the air supply will not be contaminated in the least by passing through the cellar during its journey to the heating furnace.

By thus tapping the outside air I will secure much better combustion in the furnace fire-pot. I have seen many an instance where the fire would be very poor on account of taking combustion air from a tightly closed cellar. The furnace simply could not get all the air it needed and a poor fire was the result, which was quickly remedied when the cellar window was opened.

Owing to the mislocation of registers in the house I occupy, I will be forced, in coldest weather, to operate a kerosene heating stove placed in front of and under the window of the front or living room, and all this trouble, expense and breathing of combustion products would have been obviated by the proper and common sense placing of the registers where they belonged.

Floor Plan Wanted for Six-Room Cottage

From W. H. Y., Lonoke, Ark.—I note occasional requests in the Correspondence Department of the paper for floor plans, elevations, roof plans, etc., in order to meet some specific requirements, so I come to this department of the paper for suggestions on the part of architecturally inclined readers for a floor plan of a one-story six-room and bath cottage to face north in a southern climate. There should be living room, dining room, kitchen, three bedrooms and a bath room. If it is practicable I should like two of the sleeping rooms to have direct entrances into the bath room.

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Boston, Mass., has decided that hereafter only buildings of rat-proof construction will be permitted within the city limits.

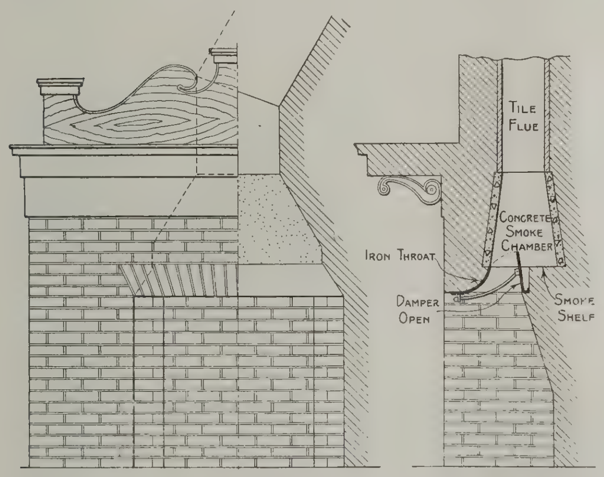
How to Design an Open Fireplace

The Proper Proportions of Opening, Throat and Flue—The Smoke Chamber—The Flue Lining

By T. W. Reynolds

THERE are doubtless many who at this season of the year turn to their fireplaces for comfort and are sadly disappointed as volumes of smoke enter the room instead of taking the course intended by the builder, who, however, may have carefully constructed the fireplace in full accordance with the ideas of the architect, the latter with rare taste and skill having designed the fireplace and mantel with elaborate architectural treatment. To produce a fireplace, however, that is satisfactory in every respect, requires that the flue be properly proportioned to the opening according to certain rules, and that the throat and smoke chamber be correctly fashioned.

The depth of the fireplace should never be less than 15 in.—preferably 20 in., and for large fireplaces 24 in. A greater depth than this is unnecessary. Except for very wide fireplaces the opening should not have a height greater than 2 ft. 6 in.



How to Design an Open Fireplace—Elevational and Sectional Views

To present a more pleasing appearance as well as for the purpose of projecting the heat into the room it is well to use splayed jambs and a sloping back as shown in the accompanying sketches. The narrow throat thus produced will form a wind break by the shelf back of it. This is effectual in stopping down drafts.

The fireplace should contract just above the arch, this point being called the throat and is very important. An improperly shaped throat is more or less of a hindrance to the passage of smoke, though the draft be ever so good. To control ventilation and shut off down drafts it is customary to provide a damper at this point. It is with difficulty that a throat constructed of masonry can be made perfectly smooth, and to overcome this it is better to use a throat of cast iron. This will form a smooth surface and give an easy angle for the passage of the gases in their course to the smoke chamber.

An additional advantage is gained by the strong lintel thus formed which will support the masonry of the chimney above. To some extent this will also protect the woodwork of the mantel.

The flames, smoke and heated air readily follow the sloping back of the fireplace with increasing velocity until they pass the throat contraction. The slope projects these gases to the front of the smoke chamber, while downward reverse currents caused by the wind being forced to the rear encounter the wind shelf and, turning, are carried upward again.

The sides of the smoke chamber should be smooth, without square angles and shoulders, and with a gradual reduction in area to the point of its connection with the flue. The chamber should not be unnecessarily large. In order to prevent a fire from burning in a one-sided manner it is desirable that the smoke chamber be drawn in toward the center of the chimney as shown in the sketches. Above this point it may be turned to the side up which the flue must pass.

In order to overcome the difficulty encountered by a badly constructed smoke chimney build one of reinforced cement and set directly above the iron throat. It may then be decreased to a flue of the proper size. Tile linings should be provided for the flues and surrounding this there should be a minimum of 4 in. of brickwork laid in cement mortar. In addition to this provide 8 in. of brickwork outside of the lining when exposed to the weather.

To quote from "Backlog Studies," by Charles Dudley Warner, "The fireplace is a window into the most charming world of which I ever had a glimpse.

"Few people know how to make a wood fire, but everybody thinks he or she does. You want first a large back log which does not rest on the andirons. This will keep your fire forward, radiate heat all day and late in the evening fall into a ruin of glowing coals like the last days of a good man. * * *

"Then you want a fore-stick on the andirons and upon these build the fire of lighter stuff."

Slate Deposits of the United States

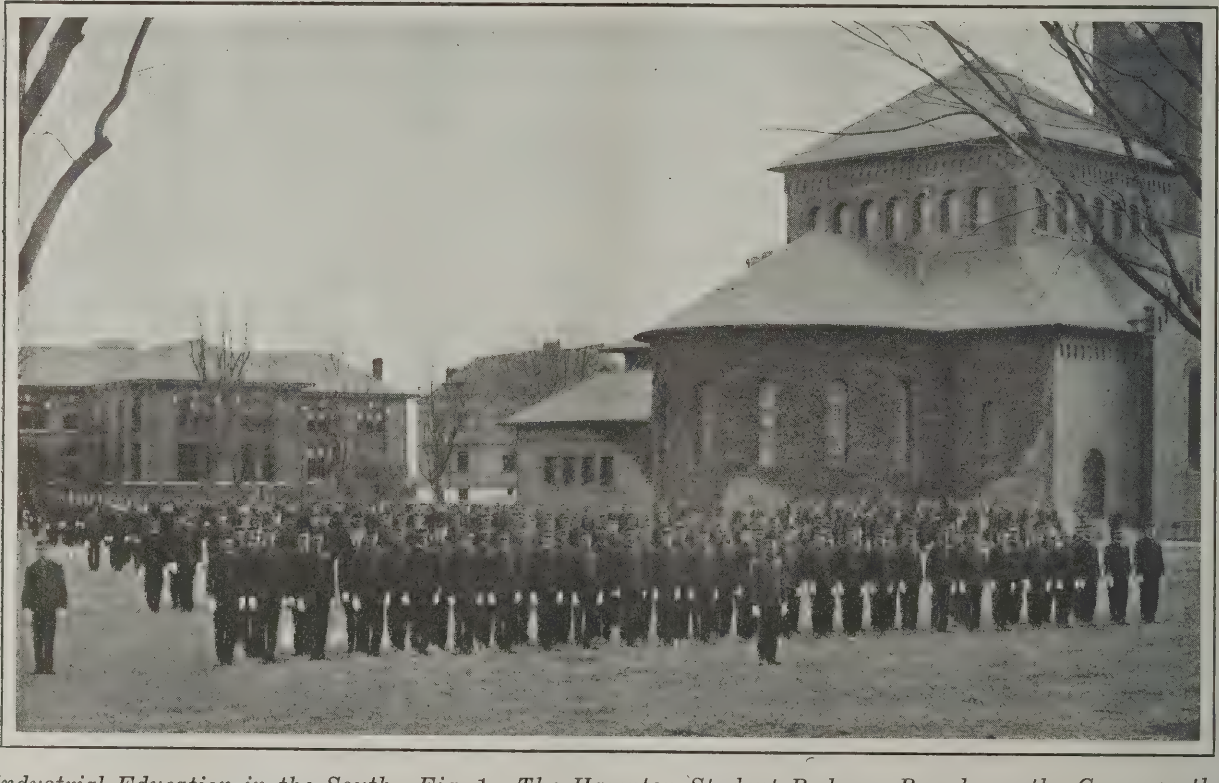
The Bulletin which has just been issued by the United States Geological Survey on "Slate in the United States," by T. Nelson Dale and others, defines and classifies the slates of the United States and describes the principal deposits. The Bulletin consists of 200 pages and is well illustrated with photographs and maps.

Panoramic View of the Waterfront at the Hampton Normal and Agricultural Institute

Industrial Education in the South

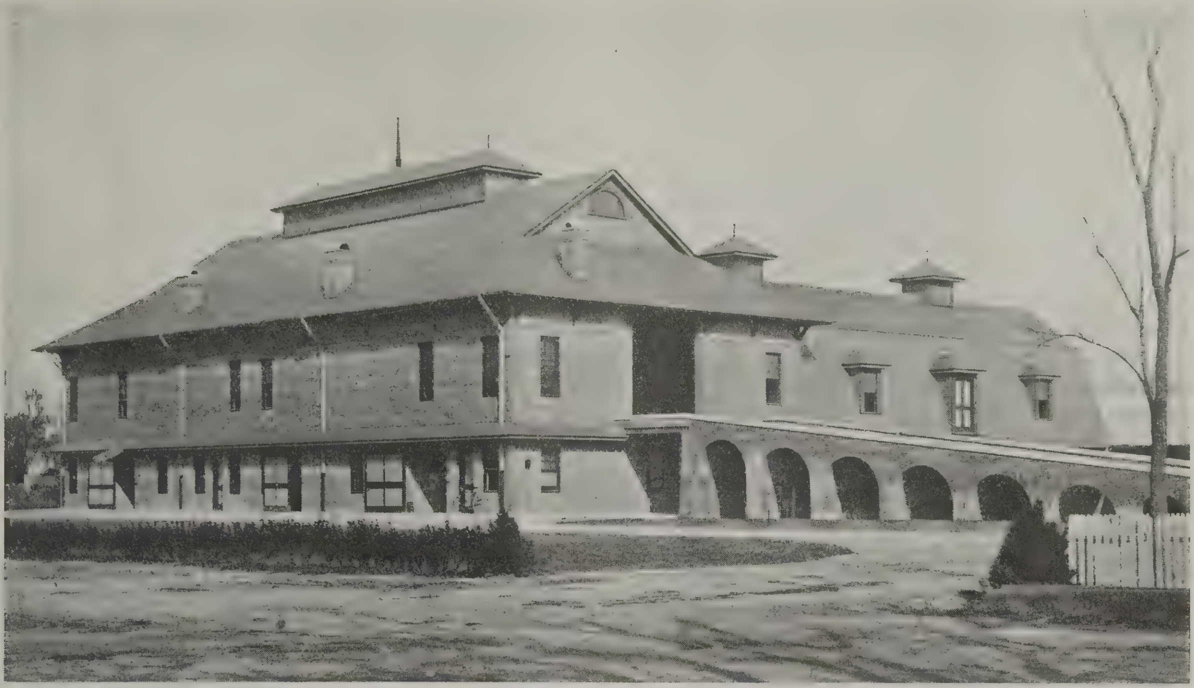
Some of the Practical Work That Is Being Done at the Hampton Institute Trade School

THE article which appeared in a recent issue of this journal calling attention to the imperative needs of the present day in the way of increased numbers of skilled mechanics emphasizes the importance of the work which is being done by the schools throughout the country in which young men are instructed in the practical fundamentals of different branches of industry in which they expect to engage as a means of livelihood. Industrial education is making rapid progress and its importance is being recognized more and more by those having at heart the welfare of the youth of our country. It is for this among other reasons that increased attention is being directed to the work of the trade school which from the viewpoint of those who have given the matter careful thought and consideration is one of the most satisfactory solutions of the problem of augmenting the supply of skilled mechanics in various branches of the building and other industries. These schools are yearly turning out hundreds of young men who are well fitted by reason of the knowledge which they have acquired to engage in the practical work of building construction and in different branches of allied industries.



Industrial Education in the South—Fig. 1—The Hampton Student Body on Parade on the Campus; the Student Band Is Seen Against the Building at the Extreme Right

A vast amount of practical and interesting work in connection with the teaching of the industrial branches has been done by the Hampton Nor-



Industrial Education in the South—Fig. 2—Barn at Hampton Institute Built by Student Tradesmen

mal and Agricultural Institute at Hampton, Va., and it may not be without interest to our readers to briefly refer to some of the leading features of the Trade School and show by means of the accompanying pictures how practical work is taught. The construction of the buildings constituting the Institute, together with the necessary repairs, are being satisfactorily done by negro and Indian tradesmen, and naturally a goodly share of the work falls to the lot of the carpenters. A few years ago when it became necessary to remodel the house occupied by the principal of the Institute, and which, by the way, was one of the oldest buildings on the Hampton campus, student tradesmen did the necessary tearing down and building up. These operations were no easy tasks as the bulk of the work had to be done in hot and dry weather. The boys, however, labored with a will and were happy in having an opportunity of doing well what professional builders regarded as a rather difficult piece of work.

Later when the school authorities decided to add a story to the Armstrong-Slater Memorial Trade School, the work of raising the heavy roof and putting in the second story was done by the students, and the manner in which it was done was illustrated and described in these columns at the time.

In the half-tone illustrations presented upon the first page of this article, the upper one represents a panoramic view of the Hampton Institute water front, while the larger, designated as Fig. 1, shows

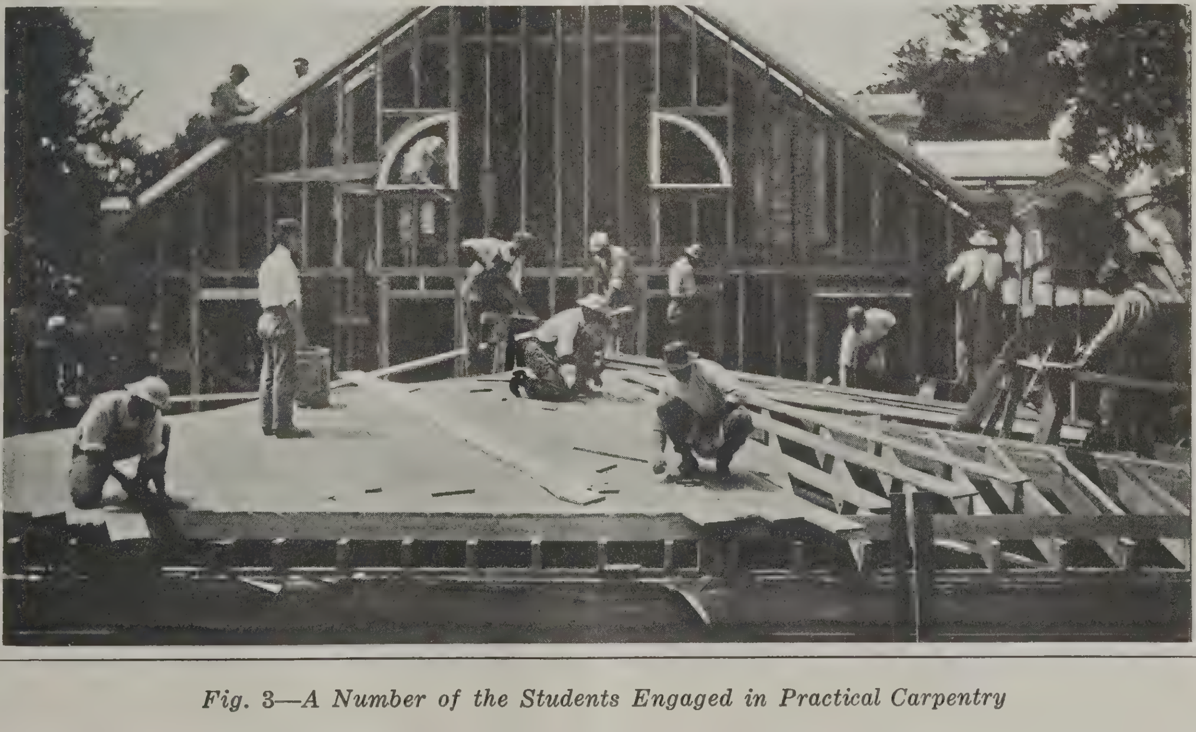


Fig. 3—A Number of the Students Engaged in Practical Carpentry

the 500 negro and Indian boys as they appear upon the campus on parade, the band being seen at the extreme right. Fig. 2 shows a barn built by the student tradesmen, and Fig. 3 represents them engaged in practical carpentry work.

One of the notable operations carried out by the members of the Trade School was the erection of a two-story brick building to be used as a social center by the boys. It is known as Clarke Hall and is used principally by the Young Men's Christian Association. In order to fully appreciate the meaning of these three examples of construction work done by the Hampton tradesmen it is necessary to see the completed structures and realize the building problems which the negro and Indian tradesmen met and successfully solved.

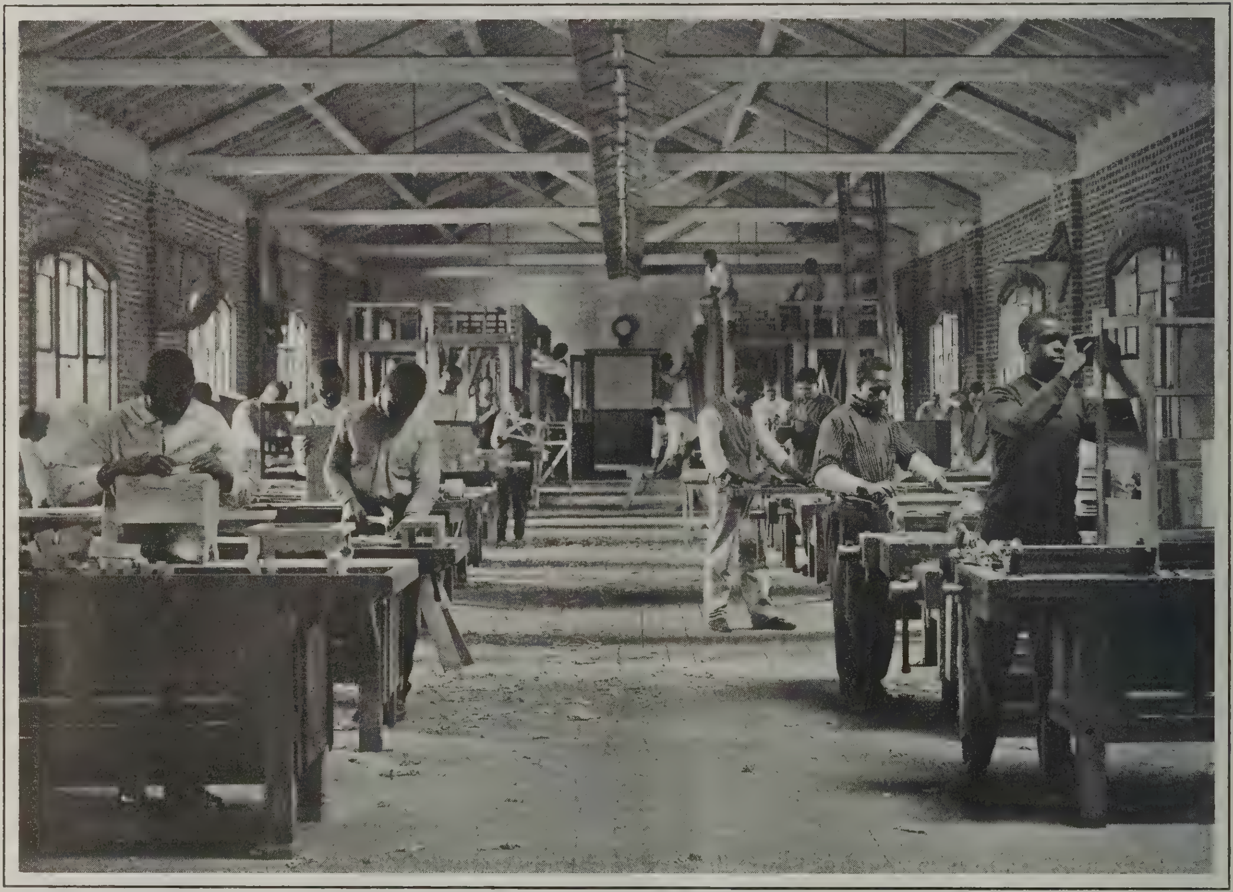
Carpentry and cabinet making are two of the thirteen Hampton trade courses and for graduation require four years of work in academic and industrial subjects. The carpenter and cabinet maker at Hampton Institute learn when they enter the technical shop that they must take good care of the equipment of tools and machines which the friends of the school have so generously provided. The newcomers are taught to work from shop drawings and to strive for accuracy and neatness. Then come the technical exercises, including the squaring of pieces of wood, blocking up ends, planing and sawing to given marks, chiseling and the making of various joints, such as butt, miter, lap, mortise and tenon and dovetail. After the boys have learned to do well and on a reduced scale the technical exercises with which every good carpenter should be familiar, they apply their technical knowledge to the making of useful articles such as tables, cases, stands, etc.

In Fig. 4 of the half-tone engravings presented herewith we show a general view of the workshop where the first-year students in the carpentry and cabinetmaking classes are learning to do practical and useful work. Fig. 5 represents an interior of the woodworking shop and shows several of the students learning to use woodworking machinery.

While the carpenter or cabinetmaker is engaged in learning the technical branches of his work he also has the opportunity of becoming acquainted with some of the allied trades and of receiving instruction for larger service, as a house builder and community worker. The extra work includes bricklaying, plastering, wood turning, painting and tinsmithing. He also spends four hours each week in the drafting room.

In the doing of technical exercises and the application of the fundamental principles of carpentry to common forms of construction and repair work, the Hampton student has to learn well the theory and practice of board measure and estimates. Under the heading of Trade Mathematics the carpenters and cabinet makers learn together in the technical carpenter shop the common methods of making calculations involved in trade problems. They are taught to apply the fundamental processes of mathematics to such problems as figuring the amount and cost of materials required for specific work. Here the aim is quickness and accuracy.

During the entire carpentry and cabinetmaking courses the Hampton students combine technical and practical work. They construct in the technical shop, for example, full-size door and window



Industrial Education in the South—Fig. 4—Interior of One of the Shops Showing First Year Work of Those Receiving Instruction in Carpentry and Cabinet Making frames, make sashes and doors, and learn how to put on the common forms of hardware. In all these operations they have to work from regular shop drawings. The applied work in carpentry includes the necessary construction and repair work which is done on the many Institute buildings. The boys are sent out on repair work singly or in small groups. They are given simple directions and rough sketches or drawings, and are expected to finish the tasks assigned to them. The students are thus given an opportunity of shouldering responsibilities and of developing initiative, judgment and executive ability. Then, too, they receive the benefit of close supervision in the regular shop work and in the building or repair operations by teachers who are themselves skilled mechanics.

The aim in the practical carpentry work, especially after the early technical training, is to prepare the tradesmen to do well, economically, and with the common tools, as much work as possible in a minimum of time. They are taught to handle their tasks like skilled workmen. The equipment in the carpentry and cabinetmaking shops is good; the materials used are of the best; the instruction is complete as possible. The boys learn to use the ordinary wood-working machines—planer, circular, band and jig saws, jointer, shaper, mortise, tenon and pulley machines and lathes. They also learn how to manage individual motors. They receive for use during their course a complete kit of good tools, being charged with the cost of those which are lost or carelessly abused. They receive compensation for all repair and construction work, in this way earning collectively some $5,000 or $6,000 a year, which they use in helping to pay for their education.

In order to carry on technical and practical carpentry side by side throughout the course, the principles of good carpentry are applied at every turn to some building or repair operation. One piece of interesting technical work which has commanded notice is a series of thirteen dormer windows, built by senior tradesmen working in pairs and within set limits as to space. The instructor, after explaining to the students the principles of dormer window construction, gives each pair of student workmen the width of the desired dormer from outside shingle to outside shingle and the size of the glass opening. Then he requires a rough sketch, a design, a working drawing and an estimate of the material needed to complete the dormer window. To do this work satisfactorily the student must use his initiative and judgment. He must be master of the task before him. The instructor gives no help until he is called upon. If in his judgment the students should work out their own salvation, he offers nothing more than a suggestion or simply raises one or two questions, the answers to which may help in solving the difficulty. If a real need arises, then the instructor stops to discuss the problem, not with one or two boys, but with the group at work on dormer-window construction. The aim is to train men to think effectively and save them from the weakening effects of too much assistance. After the drawings and estimates have been checked up and approved the student carpenters proceed with their construction problem.

Industrial Education in the South—Fig. 5—Interior View of Woodworking Shop Showing Some of the Students Learning to Use the Machines

In this single exercise the tradesmen receive review and application work in rough framing, roof framing, setting a window, putting on a cornice finish for either slate or shingles, shingling, putting on the necessary tin work and other important operations involved in good carpentry.

Another interesting piece of technical work done by the Hampton senior carpenter is that of making a model of a fairly difficult roof, about one-sixth of the full size, from an original design and drawing made by him in the drafting room. Before beginning work on his model the young tradesman is given a sheet of paper and a steel square. He is then required to find all the lengths and cuts of the rafters. He next figures the actual area of the roof—a neat problem in mensuration that is really worth while—and makes the necessary allowances for waste. The next step is to find the number and the cost of rafters—a practical application of *real* trade arithmetic. All this information must be furnished to the instructor and approved before the student is allowed to get a single stick of lumber. When all the preliminary work for his model roof has been done, he must then pick out at one selection the right kind of lumber—enough and not too much.

Making Model of a Roof

His next step in making the model roof is to cut out *all* his work before he begins to do any nailing. The skillful use of well-made drawings, the manipulation of the steel square, combined with good training in the principles of carpentry, make this difficult task possible of accomplishment by student tradesmen. Whenever there is to be overcome an actual difficulty which is beyond the student's grasp the instructor comes in and helps to ferret out the reason for the failure to make joints come right.

Stair-building offers another excellent field for testing the skill of the carpenter. Through lectures he is made acquainted with the factors and principles involved in this problem. In the drafting room he learns to draw to scale and to design several types of stairway. Then, in the shop, he is told to build a stairway in a given hight after he is told the number of winders. He must build it in a way to meet the approval of skilled journeymen.

The First Year Cabinet Makers

The cabinet makers in the first year of their trade receive instruction in the technical carpentry shop and have the same lecture work as the regular carpenters. In the remaining years of the course the cabinetmakers receive special instruction in joinery and carving, which leads on to the construction of furniture with good lines and proportions and of attractive articles for the home and school, including cases, desks, chests, screens, trays and tables. They are also taught upholstering, wood-turning, furniture staining and the finishing of various woods. They learn how to use properly and effectively walnut, pine, cedar, bass, cypress and mahogany. Like the carpenters they prepare rough sketches and then finished drawings of their work. They are encouraged to do some furniture designing. They, too, have good tools and machines with which to work. In Clarke Hall may be found some of the best products of these tradesmen.

The carpenters and cabinet makers have, in addition to special discussions on trade problems, regular shop talks one hour a week throughout three years of their respective courses. The talks aim to give the students a wider knowledge of the raw materials, tools and principles with which they have to deal in working out their daily problems in the shop, on the repair job, or on some new building.

Some of the interesting topics covered in the trade discussions and shop talks are: The uses and special purposes of woods; the seasoning and drying of lumber; various classes of structure; framing joints; the general method of framing; the sizes of timbers for framing purposes; roof framing; a lumber list for use in estimating; a hardware list; practical rules for estimating; trade words and their meanings.

Relation of Contractor to Architect and Owner

In another series of shop talks the carpenters receive instruction in the relation of the contractor to the architect, the owner or real estate agent, the dealers and sub-contractors, and the workmen; the reading of plans and specifications; the making of building contracts; general contracting or sub-letting; the buying of materials; the common building law. In the cabinet-making course the students have, in addition to the shop talks on the general principles of joinery, special instruction in historic styles of furniture and in the construction of articles usually made by cabinetmakers.

Speed, accuracy, judgment, initiative, earnestness, neatness, responsibility, conduct—these are some of the important factors which are considered in determining the grading of Hampton tradesmen. The results thus far secured in the training of carpenters and cabinetmakers have been very satisfactory. To-day negro and Indian young men trained in the Hampton Trade School, are serving their communities as good mechanics or contractors, and are also active workers in the church and Sunday school, carrying out the ideas for which Hampton Institute has stood during forty-five years.

(*To be continued.*)

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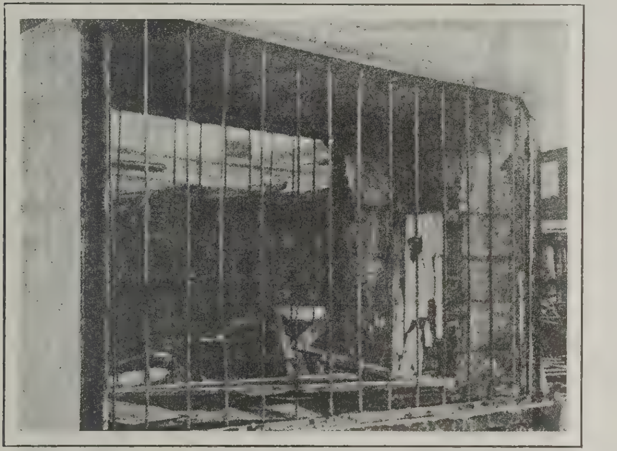
Drip-Proof Wireglass

A Pennsylvania wireglass company has evolved a new type of glass that solves a problem often of great importance in manufacturing plants, that of eliminating the drip from the underside of skylights. In many of the arts, in silk and cotton mills, paper factories, chocolate works, etc., the falling of a single drop causes great damage. The new glass is called "Aqueduct" and the undersurface has eight webs or channels to the inch, the webs being of such form as to give the greatest degree of capillary attraction. The result, says *Safety Engineering*, is that, even when pitched as low as ten degrees above the horizontal, all condensation is held and carried down to the gutter at the foot of each sheet. The strength added by the webs is so great that the makers guarantee the glass for one year against breakage from any cause whatever. This company is the first in the history of glass manufacture to make such a guarantee.

Crucial Test of Fireproof Partition

Results of an Official Test of a $2\frac{1}{2}$-In. Solid Wall of Cement Plaster and Metal Lath

THE full report of the fire and water test made a few months ago at the Columbia Fire Testing Station in New York City upon a fireproof partition installed by the Associated Metal Lath Manufacturers, following their regular recommended specification for 2½-in. solid cement plaster and metal lath walls has just been issued and we present some extracts from it. The prime purpose in undertaking the experiments which are described by Professor James S. MacGregor was that it might be determined whether the solid wall of metal lath and plaster is suitable for the enclosures of stairs and elevators and other important openings in a building. The data developed would seem to indicate that this construction may properly be classified as affording full protection against fire and water. The partition erected in the test house was the standard size required in the proposed rules of the Industrial Board, New York State Department of Labor, for the testing of fireproof partitions, namely: 14 ft. 6 in. by 9 ft. 6 in. on the outside and 9 ft. 6 in. from grate to ceiling.



Crucial Test of Fireproof Partition. Fig. 1—The Studs and Metal Lath in Place

The foundation walls were 2 ft. 4 in. above the ground level and their inside edges supported the grate. A 4 x 4-in. angle iron frame work supported the roof and the walls of the building were attached to it. Draft openings in chimney flues of dimensions required were provided.

The partition under test which formed one side wall of the building was made in accordance with the following specifications:

Two and One-half Inch Solid Metal Lath Wall

Studding.—The channel iron used in this work shall be one inch, weighing not less than .76 per lineal foot. The standing is to be set 12 in. center to center, well secured top and bottom to the construction.

Lath.—All lath used in this work to be 24-gauge metal lath, painted both sides and weighing not less than 3¼ lb. per square yard. This partition to be lathed on one side only. The lath is to be sewed to the channel iron with No. 18 gauge annealed galvanized tie wire. One tie every 4 in. vertical and one tie between each stud or vertical channel. Each tie to receive two twists. The sheets of lath are to lock, or lap at least 1 in. all edges.

Plastering.—The first (scratch) coat shall be 1 part Portland cement, 1/10 part hydrated lime and 2½ parts clean sharp sand, all parts by volume, a sack of cement being counted as 1 cu. ft. The cement and hydrated lime should be mixed together until the mixture is of a uniform color, and the 2½ parts of sand mixed with one part of this mixture. Add about 1 lb. of long cattle hair per bag of cement used. Apply with considerable pressure, getting a good key and completely covering the metal lath and then roughen the surface by scratching diagonally in both directions.

The second (brown) coat should be of the same mixture as the first coat, with the hair omitted, and should be applied to the first coat after the latter has hardened sufficiently but before it has become dry.

Immediately before the application of the second coat, or any subsequent coat, the preceding coat should be well drenched with water, applied with a brush or through a hose provided with sprinkler nozzle. Bring to a true and even surface within ⅛ in. to 3/16 in. of the face of the grounds. After this

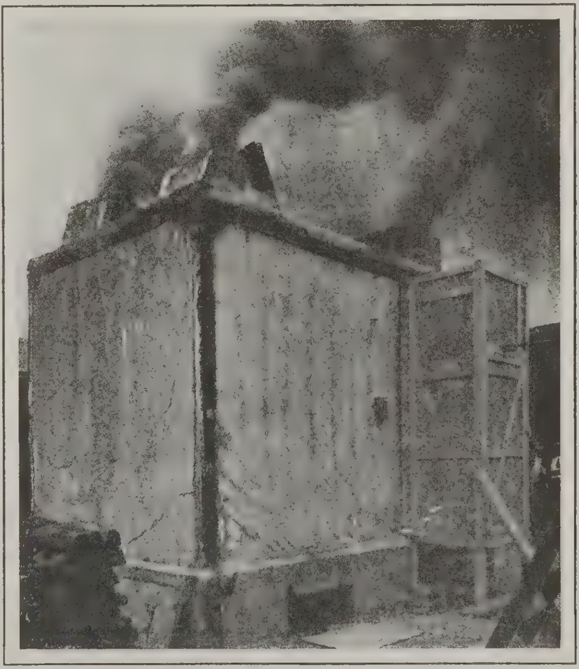
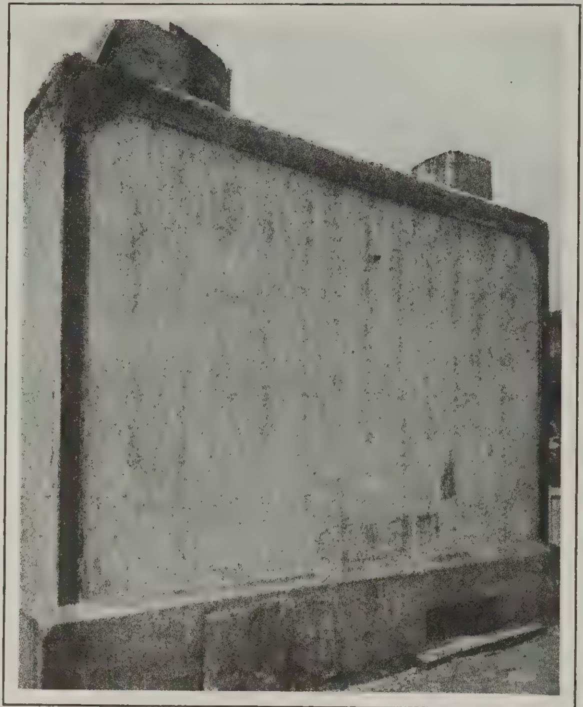


Fig. 2—Appearance After Test Had Been in Progress More Than an Hour

coat has been darbied and straightened in all directions, lightly scratch the same with a scratcher.

The finish coat should be 1 part Portland cement and 2½ parts of clean, sharp sand. After the brown coat has set firm and hard but while still green (within 12 hours after the wall has been browned out) apply a finish coat of the above mixture with a trowel and float it with a cork or carpet float to a true and even granular surface, using plenty of water in floating to bring the same to an even surface.



Crucial Test of Fireproof Partition. Fig. 3—Outside of Wall the Day Following the Test

The above mixture to be used in building up a back plastered wall 2½ in. over all.

Four different types of expanded metal lath were used, all conforming to the specifications.

As regards some of the various stages of the test, Fig. 1 shows the studding and lath in place; Fig. 2, the appearance after the test had been in progress a little more than an hour; Fig. 3 shows the outside of the wall the day following the test, while Fig. 4 represents the inside of the partition the day after the test.

To sum up it may be stated that the results of the test showed that four minutes after the start hair cracks developed along the two central channel studs and there were also two diagonal cracks in the lower back corner of the wall. At the end of ten minutes cracks had appeared along eight channel studs and two diagonal cracks were noticed in the front lower corner of the partition. All cracks were emitting steam freely, which was formed by the moisture in the wall. Additional cracks along the studs and also diagonal cracks at the corners, both top and bottom, developed as the test progressed.

No cracks were noted on the inside face of the wall until after 1½ hours, when four cracks appeared in the lower front corner of the wall, averaging about 2 ft. in length. Nothing further was noted until 2 hours 40 minutes of firing had passed, when the inner surface of the wall became crazed with innumerable hair cracks, extending in all directions. The maximum crack opening was only 1/16 in. deep.

The partition started to deflect inward almost immediately after the test was started; the maximum deflection was 4 3/16 in. After cooling the wall with water, the deflection was 2 7/16 in.

The temperature recorded by the middle couple at the end of the first half hour of the test was 1723 deg. F., and the average temperature of the three couples for the last two and one-half hours was 1746 deg. F.

The application of water washed away a large portion of the finished coat of plaster, and some of the second coat in patches extending over a total area of about 16 ft. x 16 ft. No metal was exposed.

Neither the fire nor the water did sufficient injury to the wall to destroy its stability or fire-resisting quality. No fire, smoke or water penetrated the partition and after it had dried out, it was firm and gave a good ring when struck with a hammer.

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Officers of Cleveland Builders' Exchange

At the annual meeting of the Builders' Exchange of Cleveland, Ohio, November 11, officers for the ensuing year were elected, as follows:

President, A. C. Klumph; vice-president, Sam. W. Emerson; treasurer, Henry Watterson; secretary, E. A. Roberts; assistant secretary, C. D. Jamieson.

Mr. Klumph, who succeeds George A. Rutherford, has been on the Board of Directors three years and for the past year has been vice-president. He is a prominent lumberman and has served as President of the Cleveland Board of Lumber Dealers and the Ohio Lumber Dealers Credit Association. Mr. Emerson is a concrete contractor and instructor in the School of Concrete Construction operated under the auspices of the Builders Exchange. Mr. Watterson is a well known carpenter-contractor of the city of Cleveland.

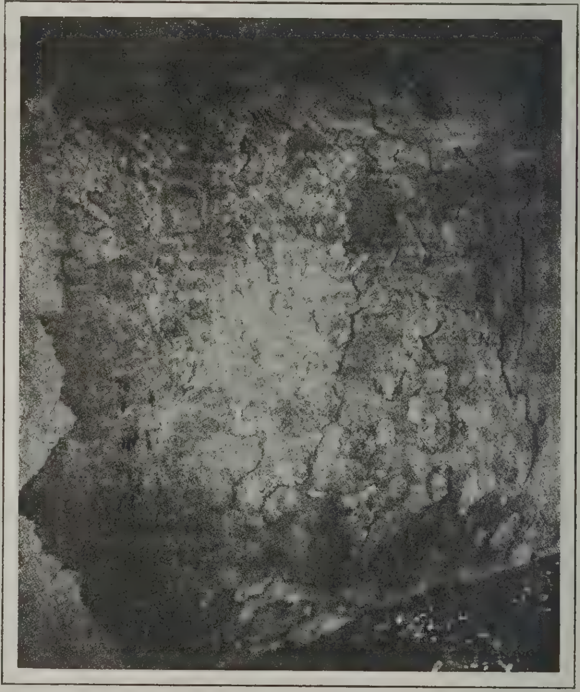

Fig. 4—The Inside of the Partition the Day After the Test

New Publications

Furniture for the Craftsman. By Paul D. Otter. 306 pages. Size 6 x 9 in. Illustrated with 297 pen and ink drawings. Bound in board covers. Published by the David Williams Company, 231 to 241 West Thirty-ninth street, New York City. Price $1.50, postpaid.

A fruitful source of winter work or whenever the regular season is dull is the making of various articles or pieces of furniture and furnishings for the household by the building mechanic who is clever in the handling of his tools. In the book under review the author has presented a great variety of interesting examples of work of the nature indicated together with much valuable information as to the manner in which each piece of work can be successfully and economically accomplished. The book may be regarded as a manual for the student and mechanic, the information contained within its covers being presented in such a way as to be of the greatest practical value to those for whom it is especially intended. Mr. Otter is a practical man of wide experience thoroughly familiar with all the details of furniture construction and design. What he has to say, therefore, reflects the ideas of the practical rather than merely the theoretical.

Much of the material contained within the covers of the book originally appeared in the columns of *The Building Age* and our readers are therefore more or less familiar with the style in which Mr. Otter handles his various subjects. A great deal of additional matter, however, has been added to the original articles and all has been arranged in the form of a handbook in order to meet the more general requirements, under the title given above. It is pointed out that in addition to the carpenter, the builder, the cabinet maker and the manual training student, there is "the day-fagged business man as well as many others who are likely to find refreshment from commercial and professional pressure in the increasing skill of doing things and in the joy of their accomplishment." The various subjects are treated within the compass of 16 well arranged and carefully illustrated chapters. One of these considers the essential tools and equipment necessary for doing the work, while others describe various kinds of furniture as well as bath room accessories. The concluding chapters are devoted to finishing and upholstery.

More or less attention is given to the design and construction of the furniture usually found upon the porch of the country house or modern mansion as well as about the spacious grounds. The work considered as a whole meets a well-defined demand and coming at this season is especially opportune.

Lumber and Its Uses. By R. S. Kellogg; 352 pages. Size $6\frac{1}{4}$ x $8\frac{3}{4}$ in. Profusely illustrated. Bound in board covers. Published by the Radford Architectural Company. Price $1.00.

So intimately associated with the building business is the subject of lumber that anything pertaining to its characteristics, manufacture and uses cannot fail to command the earnest consideration of architects, builders and contractors. The work which Mr. Kellogg has prepared deals with phases which have heretofore received very inadequate attention, and his effort has been to make the book a reliable source of information upon those subjects. He tells of the structure and physical properties of wood; enumerates the standard sizes of lumber—something in which every practical builder is interested; discourses upon structural timbers, wood preservatives, paints and stains, hardwood flooring, fire-resistance, lumber prices and the uses of lumber. Not the least interesting features are the paragraphs describing the commercial woods.

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Year Book of New York Society of Architects

We are indebted to William T. Towner, secretary of the New York Society of Architects, for a copy of the 1914 Year Book which has just been issued from the press. In its general style and make-up it accords with those of previous years and contains within its flexible leather covers a vast fund of information of special interest to architects and builders not only in Greater New York and vicinity, but throughout the country. The present issue of the Year Book contains all the new laws and amendments to existing laws which were enacted during the year.

Among the new laws are the State Housing Law for Cities of the Second Class; the Workmen's Compensation Law; The Industrial Board Rules and Regulations for Factories; the amendments to the Labor Law in regard to Factories and Mercantile Establishments in the State; some amendments to the New York City Charter extending the powers of the Fire Prevention Bureau, the Board of Estimate and Apportionment in regard to the hight of buildings and districting the city into zones; also some Ordinances of the Board of Aldermen affecting Signs and Fences which seem to conflict with some provisions with the Electric Sign Ordinance, and the change in the Building Code affecting dumbwaiters.

There is also to be found the Arbitration Law of the State; Fire Insurance Requirements by the National Board of Fire Underwriters; a Building Ordinance for Villages and Small Cities compiled by the National Fire Protection Association, the National Board of Fire Underwriters and the American Institute of Architects.

There is a draft of a proposed New York State Law for Registration of Architects—an educational measure designed to gradually raise the standard of qualification for practicing architecture without interfering with the rights of those now members of the profession and without interfering with contractors or others who may wish to make their own drawings without the assistance of an architect.

The objects of the New York Society of Architects are given; also the Constitution of the Society and Officers and Standing Committees. There is a list of architects in New York City as well as throughout the state; a directory of the American Institute of Architects; building statistics for several years; a directory of the Board of Examiners and Bureaus of Buildings, together with much statistical data that the architect will find constantly convenient for reference. Copies of the Year Book are obtainable at $5 each from the secretary at 320 Fifth avenue, New York City.

Brief Review of Building Situation

Figures Showing Building Activities in Leading Centers of the Country in October, 1914, and October, 1913

WITH the waning of the building season it is natural to expect a lessening of activity in leading centers of the country, and this tendency is aggravated somewhat by the extreme conservatism which prevails in business circles. Reports from 98 cities of the country for October indicate a falling off in building operations as compared with October a year ago of 21.79 per cent., there being 28 cities in which increased activity was noted compared with the same period last year.

For convenience of comparison we have divided the country into four zones and find that 36 cities of the Eastern States report a loss for October of 12.7 per cent., there being 14 cities reporting increases and 22 decreases. In contrast to some of the previous reports the total for Greater New York shows an increase over 1913, the moderate losses in the boroughs of Richmond and Queens being more than offset by the expansion in Manhattan, Brooklyn and the Bronx.

The accompanying table shows the relative building activity in the cities named:

CITIES IN THE EASTERN STATES

	1914		1913	
Albany	296	$239,225	261	$781,965
Allentown	38	156,975	28	81,400
Altoona	79	79,916	56	73,822
Atlantic City, N. J.	..	1,450,553	..	1,321,940
Bridgeport	78	174,437	94	185,195
Brockton	49	82,260	44	223,435
Buffalo	347	604,000	419	1,347,000
Erie	105	115,412	84	179,813
Harrisburg	23	53,475	37	153,615
Hartford	75	360,135	108	423,040
Hoboken	21	29,100	23	16,414
Holyoke	11	15,775	20	44,500
Jersey City	89	156,850	100	401,589
Lawrence	19	268,350	20	62,900
Manchester, N. H.	95	97,499	110	149,022
Newark	182	709,080	217	677,330
New Bedford	99	175,350	118	397,387
New Haven	98	231,315	97	214,785
New York:				
Manhattan	320	4,023,152	443	2,996,843
Bronx	281	1,292,080	347	907,397
Brooklyn	1013	2,719,320	915	2,553,180
Paterson	72	55,247	55	175,255
Philadelphia	1229	2,467,310	1290	2,715,850
Pittsburgh	353	1,085,348	294	1,362,387
Plainfield	19	29,320	..	46,150
Portland, Me.	31	77,630	26	72,000
Reading	24	28,475	35	103,125
Rochester	237	401,192	314	735,403
Schenectady	72	99,235	398	1,653,660
Scranton	71	300,835	38	102,251
Springfield	112	228,825	108	327,498
Syracuse	163	293,080	98	121,405
Troy	54	64,178	4	114,000
Utica	57	279,925	167	457,702
Wilkes-Barre	168	54,087	55	206,687
Worcester	143	590,807	131	494,044

Taking next in order the cities of the Middle States we find 7 reporting an increase as compared with last year and 25 a decrease, with a total falling off for the middle section of the country of 28.6 per cent. The more important increases are found in Cleveland, Columbus, Duluth, St. Louis, St. Paul and Des Moines.

CITIES IN THE MIDDLE STATES

	1914		1913	
Akron	126	$304,815	270	$463,428
Cedar Rapids	...	245,000	46	496,000
Chicago	677	6,744,100	1020	9,314,000
Cincinnati	1242	402,235	1096	589,345
Cleveland	1149	2,265,685	1034	1,979,075
Columbus	201	649,220	271	590,005
Davenport	40	63,220	46	145,050
Dayton	43	36,203	75	252,225
Des Moines	48	145,084	71	123,360
Detroit	581	1,491,225	809	3,079,540
Duluth	136	236,625	142	212,452
East St. Louis	41	51,038	68	92,712
Fort Wayne	60	161,400	62	173,785
Fremont, O.	...	15,215	...	155,225
Grand Rapids	155	152,080	165	257,863
Indianapolis	406	337,689	454	573,048
Kansas City	228	533,790	317	1,540,705
Kansas City, Kan.	71	66,552	77	69,030
Lincoln, Neb.	29	53,800	47	89,037
Milwaukee	282	611,577	351	1,213,695
Minneapolis	499	1,064,570	551	1,240,950
Omaha	73	157,675	91	294,025
Peoria	44	165,660	56	290,900
St. Joseph	49	25,100	56	61,128
St. Louis	738	1,115,874	736	820,073
St. Paul	200	1,001,300	201	804,252
Saginaw	17	54,635	42	36,529
Sioux City	33	52,795	74	365,162
South Bend	23	25,153	28	40,250
Toledo	192	404,939	257	845,360
Topeka	42	50,855	54	50,885
Youngstown	103	203,690	75	207,680

In the South, cities reporting building activity fell off 32.46 per cent. in October, as against the same month in 1913. Of the 14 cities reporting, 4 show an increase and 10 a decrease. The figures for Wilmington, Del., are especially noticeable, owing to the fact that one of the permits covered a county and city building costing over $1,000,000.

CITIES IN THE SOUTHERN STATES

	1914		1913	
Atlanta	212	$215,988	335	$338,340
Baltimore	215	289,567	287	697,606
Birmingham	323	138,373	368	254,741
Chattanooga	280	61,872	215	89,470
Dallas	100	204,150	159	519,435
Louisville	148	327,040	210	332,580
Memphis	72	99,235	398	1,653,600
Nashville	225	82,569	45	73,496
New Orleans	..	286,378	..	208,750
Richmond	87	122,620	87	147,060
Savannah	45	67,800	71	120,235
Tampa	131	110,347	136	104,163
Washington	464	407,411	381	660,932
Wilmington, Del.	56	1,162,229	64	123,902

Coming now to the extreme West, and taking important cities lying beyond Denver, Colo., we find 16 cities which figure an aggregate loss of 15.7 per cent. Important increases are found in San Francisco and Seattle.

CITIES IN THE WESTERN STATES

	1914		1913	
Berkeley, Cal.	94	$132,950	109	$158,050
Colorado Springs	26	11,600	35	20,750
Denver	..	157,985	..	241,703
Fresno, Cal.	..	95,663	..	105,085
Los Angeles	762	1,573,222	1460	1,701,550
Oakland	358	412,649	348	777,387
Pasadena	192	132,394	168	133,920
Portland, Ore.	426	508,705	631	681,710
Pueblo	15	48,549	17	44,889
Sacramento	168	127,015	94	236,245
Salt Lake City	..	107,605	..	171,390
San Diego	192	115,886	292	554,779
San Francisco	..	1,479,518	..	1,118,280
Seattle	866	809,405	919	683 380
Spokane	61	60,050	78	140,340
Tacoma	90	46,563	187	138,223

For the ten months ending October 31 reports from leading sections of the country indicate a falling off of only about 5 per cent. as compared with the corresponding period of 1913.

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American Concrete Institute

The eleventh annual convention of the American Concrete Institute will be held at the Auditorium Hotel, Chicago, Ill., February 9 to 12, inclusive, 1915. This convention will mark the completion of the tenth year of the existence of the Institute and an especially interesting and profitable program is being arranged.

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Ground was broken with appropriate ceremonies on October 17 for the Lumbermen's Building and House of Hoo-Hoo, which is to be erected at the Panama-Pacific International Exposition in San Francisco, Cal.

Burts by the Dozen

When a large corporation buys equipment, it is usually purchased on the competitive basis. That is how the Oliver Chilled Plow Works settled their ventilation problem. After thorough tests the Burt was the ultimate winner, as was the case with the United States Government, the U. S. Steel Corporation, the Standard Oil Company, and other concerns which select their ventilators on the results of competition.

But just because the Oliver Chilled Plow Works buys 48 Burt 24″ Ventilators at a time, don't think that we are not ready and anxious to handle smaller orders. Burt Ventilators are making good all over the country and Burt representatives are also making good.

Show your customers the Burt. Let them see how the Burt combines skylight and ventilator. A Burt Demonstration leads to Burt Ventilation.

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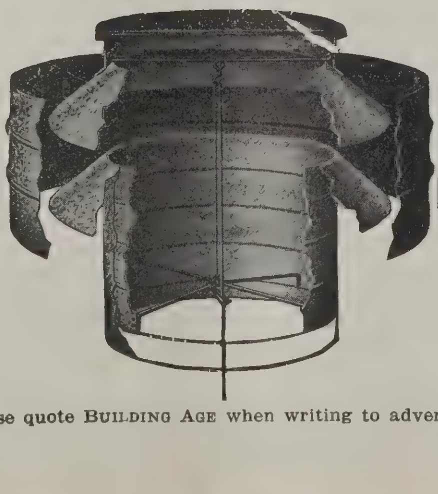

Our Recruiting Office

is busy enrolling the names of carpenters and contractors who realize that

Wood is the only material of which a floor can be made that in every way is satisfactory to all who use it.

Acting on their knowledge they are busy putting "Maximum Value One-Piece Hardwood Floors" in every building that needs a new floor.

"Winter Dullness Routed"

is the report from every section where an active campaign has been started.

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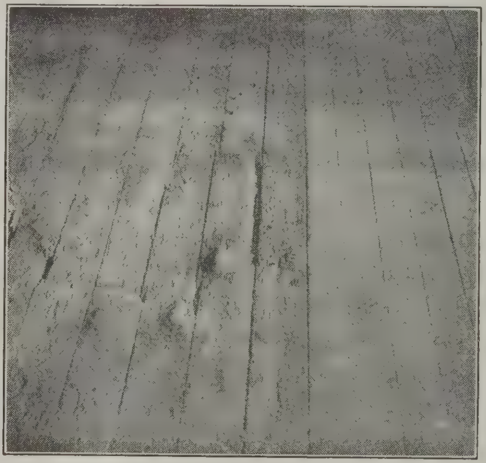

After twenty years Maple shows no wear. Study the condition of the other floor.

A small army would be required to put in all the Maple, Beech and Birch floors that should be laid in your town this winter.

You may not hope to replace all the wornout floors in the next six months, but you should and with very little effort you can make a start, and from that start you can build up a flooring business and a general jobbing business that will be a source of much profit to you.

We have the means and shall be glad of the opportunity to help you make a start.

Send for free instructions.

Maple Flooring Manufacturers' Association
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Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Pure Air Furnaces

It is quite possible that furnace gas and dust, or the fear of them, restrain many house owners from using warm air furnaces in heating their houses, but this fear should be idle so far as properly constructed furnaces are concerned. The point is made by the manufacturers that on account of the construction of the "Leader" furnace there is not the slightest possibility of leakage, as it is a health furnace. The atmosphere of a Leader-heated house is pure and is provided with the proper percentage of moisture. The inner body of this furnace is a steel box, made up of large plates, and wherever these plates join, the steel is melted and welded together, making the entire body practically one continuous piece of metal. By this construction the furnace is unaffected by contraction and expansion and leakage is impossible. The firebox is enclosed and the air breathed does not pass against it. Its construction provides very large radiating surfaces. Readers of *The Building Age* can obtain catalogue and full details of furnace installation by writing to the manufacturers, the Hess Warming & Ventilating Co., 1201 Tacoma Building, Chicago, Ill.

Vertical Sliding Gable Door Fixtures

A door fixture which has been designed to meet the demand for a low-priced outfit and give entire satisfaction in operation is the construction illustrated in Fig. 1 of the engravings and recently placed upon the market by the Richards-Wilcox Mfg. Company, Aurora, Ill. The fixture is intended for use only with vertical sliding door as shown in the picture. The guides operate on a steel track with brackets attached 24 in. on centers. The door is counterbalanced by weights attached to a steel cable which passes over two cable pulleys located above the door as shown. The arrangement is such that the door can be easily lowered or raised, thus permitting the use of the entire opening or a part of it as may be desired. These counterbalanced weights can be made of any convenient material, but the company recommends concrete, as they can always be made on the job. Concrete weighs 137 lb. to the cubic foot, and where 2 x 6-in. studding is used the weights should be 8 in. wide, 5 in. thick, and of a hight which is governed by the weight of the door. The steel track on which the guides operate is made in 6, 8 and 10-ft. lengths.

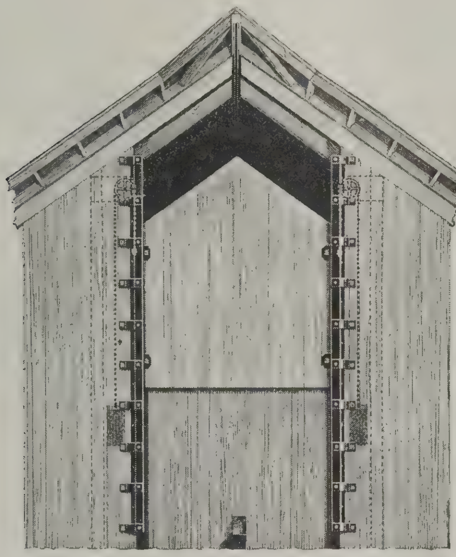
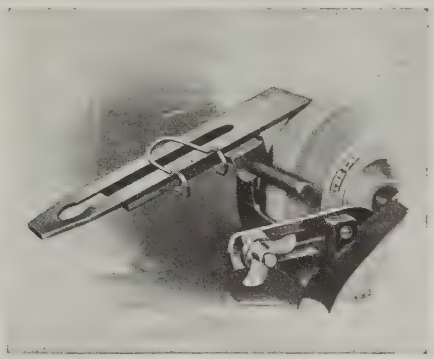


Fig. 1—Vertical Sliding Gable Door Fixtures

The Carborundum Tool Grinding Guide

What is regarded as one of the simplest yet most practical devices of its kind now before the trade is the new Carborundum Tool Grinding Guide for use on the Carborundum Niagara Grinders Nos. 1, 2, 3 and 4 and illustrated in the accompanying illustrations. As of special interest to our practical readers we would state that the guide consists of a flat base or plate of steel which slides back and forth on a guide-rod or support. The plane bit or chisel is securely held to the base or plate of the device by means of a strong clip or spring. The claim is made that there is absolutely no chance for the tool to slip, as it is always held in the position desired by the operator. A simple movement of the hand of the operator tilts the tool to any desired angle in order to obtain the required bevel. Fig. 2 represents the guide with a plane iron in position for grinding, while Fig. 3 shows the simplicity of the operation of actually doing the work. It is to be



The Carborundum Tool Grinding Guide—Fig. 2—The Device with Plane Iron in Place for Grinding

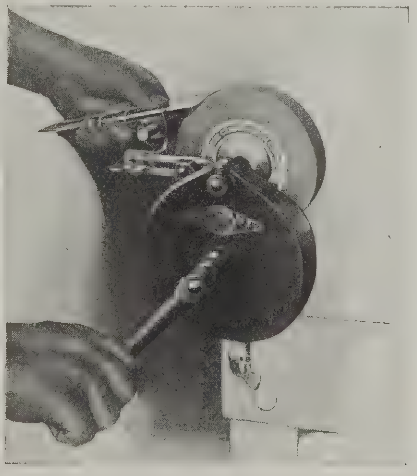
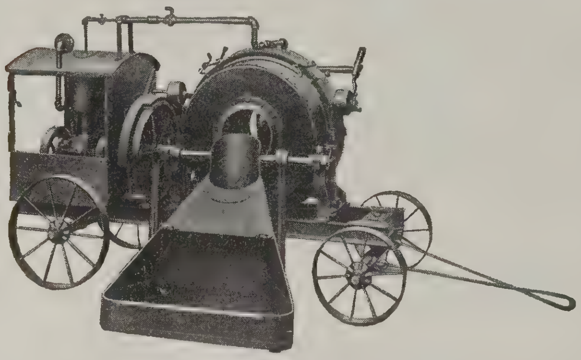


Fig. 3—The Method of Operating the Tool

noted that the arrangement is such that the tool always moves parallel to the axis of the wheel, while the construction is such that there are no set screws or complicated adjustments to be manipulated. This tool grinding guide is made by the Carborundum Company, with headquarters at Niagara Falls, N. Y.

The Smith Concrete Mixerette

The latest addition to the non-tilting line of Smith mixers, brought out to meet a demand which has manifested itself during the past two years for a light, portable and inexpensive concrete mixer of small capacity, is the Smith Mixerette illustrated in the accompanying engravings. The point is made that the mixerette holding 5 cu. ft. of dry sand, stone and cement, or 3 cu. ft. of mixed concrete, will produce 5 cu. yds. of mixed concrete per hour—which is what is needed by contractors for the small concrete jobs. In this machine there are two features which stand out very prominently. The main drum ring and driving pinion are entirely enclosed and protected from the finest particles of dirt or dust. The drum ring itself combines a large gear encircling the drum and two machined tracks. The dust-proof casing which covers the drum ring has two machined surfaces which snugly fit over the two machined tracks encircling the drum. This forms the bearing surface upon which the drum revolves. The sliding bearing eliminates main rollers and other supporting and driving mechanism, while the lower portion of the casing coming down to the truck sills forms a supporting pedestal for the drum. The dust-proof casing is fitted with pressure grease cups so that the machined surfaces can be kept cool and clean at all times. This excludes the dust and greatly increases the life of the mixer itself. This new feature will strongly appeal to the many contractors who have continually experienced trouble with their main roller tracks developing flat spots and the main rollers themselves rapidly wearing out, thus causing an uneven motion of the drum which wears out the driving pinion and at the same time causes great loss of power on the machine. Another conspicuous feature of the mixerette is the "ropeless" loader, the skip being raised by means of gears. There are no cables to break and no sheaves to get out of order, consequently none of the jerking, twisting motion of the ordinary pivoted hopper and no binding strain on the loader frame. It lifts easily and smoothly, being controlled by the jaw clutch and the brake. When the skip reaches its highest point discharging into the drum, it strikes a projecting finger which automatically disengages the hoisting clutch, thus preventing any strain or damage to the hoisting mechanism. The Smith Mixerette is operated by a high priced hopper cooled gasoline engine enclosed in a steel house. The drum is equipped with three deep scoop-like blades which in connection with the long, sharp angle discharge spout gives a very rapid discharge. The equipment as shown herewith is light and durable, weighing only 2500 lb. For the contractor who does not want to invest the money in a power charger equipment as shown the T. L. Smith Company, 3120-A Hadley street, Milwaukee, Wis., furnishes the mixerette equipped with gated batch hopper. Such a rig weighs only 1875 lb. and with its low feed level of 3 ft. 10¼ in. is an equipment likely to appeal to a great many building contractors having concrete work to do. Fig. 4 represents the Smith Mixerette with loader, gasoline engine and pipe connection, the chute being in the discharge position. Three handles are provided so the batch can be dumped from any point about the machine. Fig. 5 shows the mixerette mounted on steel truck with gasoline engine, loader and water pipe connection.



The Smith Concrete Mixerette—Fig. 4—The Machine with Chute in Discharge Position

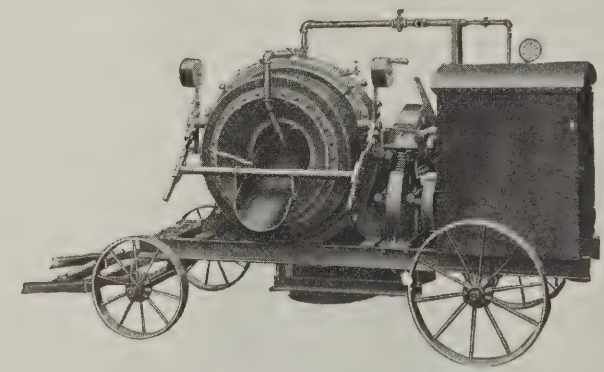


Fig. 5—The Smith Mixerette Mounted on Steel Truck with Engine, Loader and Pipe Connections

Stanley Concealed Ratchet Bit Braces

A somewhat radical departure from previous construction has just been incorporated by the Stanley Rule & Level Company, New Britain, Conn., in its latest concealed ratchet bit brace No. 811, the improvement consisting in the chuck or shell, which is ball bearing. The chuck bodies are machined to receive the jaws and the ball bearing feature is of great advantage for firmly securing the bit. The ratchet parts are entirely enclosed, thus keeping out moisture and dirt while retaining lubrication and protecting the operator's hands. The ratchet mechanism is interchangeable, may be taken apart by removing one screw, and is readily put together again. The two-piece clutch, which is drop forged, machined and hardened, is backed by a very strong spring, thus insuring a secure lock. When locked ten teeth are in engagement, while five are employed when working as a ratchet. The jaws, which are of the universal type, hold round shank bits and drills from ⅛ in. to ½ in. and taper shanks as large as a No. 2 Clark's expansion bit. The heads and handles are of cocobolo and the entire brace is heavily nickel plated. It is interesting to note that the exclusive patented feature of the concealed ratchet is now being used by the company in connection with other bit braces, which enables it to bring out new designs from time to time. The general appearance and construction of the various parts are clearly indicated in Fig. 6, the sectional view at the left showing the ball bearing chuck.

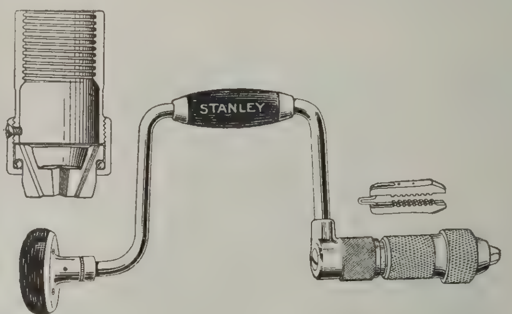


Fig. 6—The Stanley Concealed Ratchet Bit Brace Showing Jaws and at the Left the Ball Bearing Chucks.

Buying Lumber by Mail

It is generally the aim of the building contractor to buy the best quality of lumber at the lowest price regardless of the source of supply. It is profitable for

(*Continued on page* 74)

"It's Millwork That Delays Your Job"—

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Gordon-Van Tine Co.

Rush Orders a specialty. Our ***shipping service*** is ideal. Our stocks are so complete, ***always,*** that no building job is ever held up because of delay on a few items. We carry in stock hundreds of bargains that cannot be bought elsewhere except on **special order** at high prices. Quality, Quantity and Satisfaction Guaranteed or Money Back.

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Extra "Star A Star" 6 to 2 in., Washington Red Cedar Shingles, price per thousand $3.10. Special prices on Bevel Siding or Clap Boards, Red Cedar Siding, White Pine Siding, etc.

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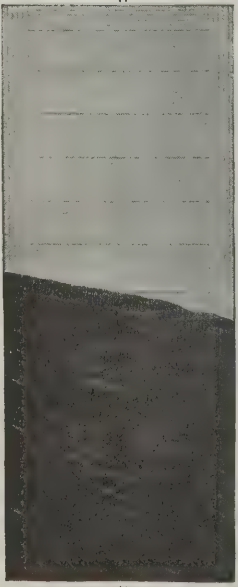

Sanitary Flush Doors
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Best for Hospitals and Schools; unexcelled for Hotels, Offices and Public Buildings; equally well adapted for high-class Residences.

Specifications:

Form cores of Veneered Doors having plain surfaces with narrow strips of sound Chestnut or White Pine, glued, cross-framed and doweled together, with edge strips of same wood as face veneers. Keep cores at proper temperature until glue is set and all surplus moisture evaporated.

Dress Cores to required thickness, with uniform and true surface, and cover both faces with ⅛-inch edge-glued veneers, applied under hydraulic pressure; when thoroughly dry and seasoned, sand and polish to required thickness.

Doors having openings for glass to be framed up and veneered as above specified, with glass moulds mitered around openings.

Specify and insist upon a construction as outlined and you will secure best results.

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him to deal with a large concern which specializes in supplying carpenter-contractors and builders throughout the country providing the quotations are lower than he can obtain locally. In this connection the Hewitt-Lea-Funck Co., 359 Crary Building, Seattle, Wash., makes a forceful appeal to the readers of *The Building Age*, which cannot fail to command their consideration. By eliminating the middle man the cost of distribution is brought to a minimum which results to the builders' profit. It may be of interest to state that the Hewitt-Lea-Funck Co. owns and controls six large saw mills and millwork factories, located close to forests of old-growth yellow fir and red cedar. A large distributing yard equipped with modern labor-saving devices permits the company to make spot shipments, while its extensive facilities allow it to specialize in lumber and products thereof. The carpenter-contractor and builder is assured of high grade quality at an attractive price on every kind of lumber or millwork entering into the construction of any building. The extent of the company's cooperation in assisting the carpenter-contractor and builder to make up a bill of materials is wide. It maintains an expert staff of architects in its architectural department to render any help to the buyer in the preparation of plans. Some idea of this scheme may be gathered from the literature that was reviewed in our last issue. Two excellent volumes replete with illustrations, plans, and specifications will be sent to the reader on application. The Prize Plan Book will be sent for ten cents and the Barn Builder's Guide for four cents. On receipt of these the reader will find that the information contained therein more than pays for the few cents spent. One of the special products of the Hewitt-Lea-Funck Co. is a patent stud and wall board which is claimed to cost 25 to 50 per cent. less than back plaster.

Schill's "New Idea" Furnace

This is the season of the year when the question of heating the house is pre-eminent and many of our readers are, therefore, likely to be interested in the warm-air furnace which we illustrate in Fig. 7, embodying as it does many features which are worthy of more than passing notice. The casing is made of corrugated iron, asbestos and galvanized iron, thus permitting very little heat to radiate into the cellar. In the construction of a furnace much depends upon the firepot, for no matter how scientific the remainder of the furnace may be made, satisfactory results cannot be obtained unless the fuel is consumed in a way to produce the required heat. In the "New Idea" here illustrated and made by the Schill Bros. Company, Crestline, Ohio, the firepot is double, consisting of an inner heavy cast iron

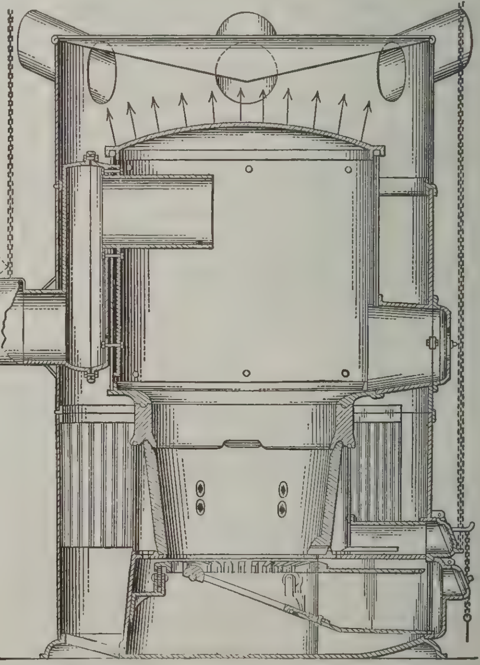
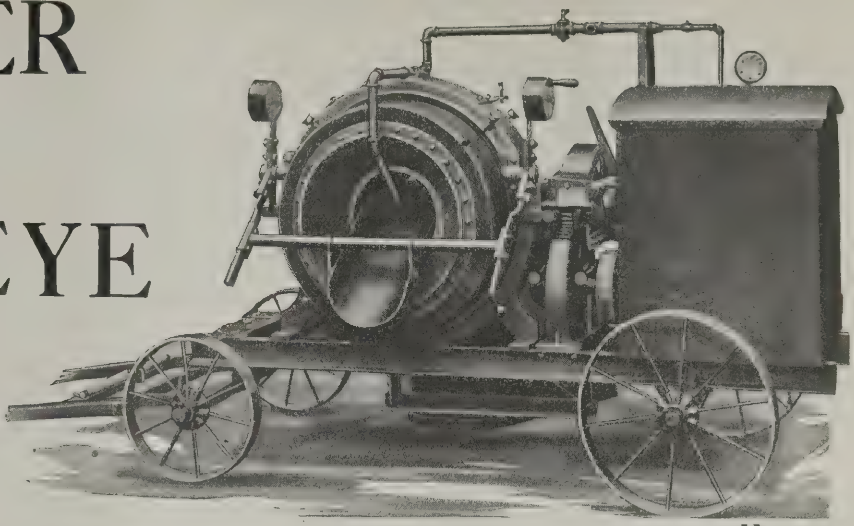


Fig. 7—Vertical Section of Schill's "New Idea" Furnace

(*Continued on page 76*)

ANOTHER SMITH BULL'S-EYE



You, Mr. Contracting Public, demand a light, portable and inexpensive mixer for the small concrete work—a mixer that will hold a five-foot batch of loose material or three feet of mixed concrete.

The **New** Smith Mixerette hits the very center of this demand. It has all the above features and with them embodies **Smith Quality**—the same high standards that were in evidence in the **Big** Smith Mixers that achieved world renown at Keokuk and Hauser Lake, on the Sea Wall and Causeway at Galveston, on the Key West Extension of the Florida East Coast Railway, on the New York Aqueduct, out at Arrowrock and on a multitude of other famous projects.

SMITH MIXERETTE

This machine has two improvements which are bound to make it famous. The main drive ring and driving pinion are entirely enclosed and protected against dirt and dust. The big gear ring encircling the drum fits snugly into the outer casing, the machined surfaces forming a perfectly true sliding bearing. A constant supply of grease keeps this bearing clean and cool at all times.

The other **big feature** is the "ropeless" power loader. Being gear driven, the skip lifts quickly and smoothly. Having no hoisting cables or sheaves, the twisting, jerking motion common to loaders of the pivot type, is entirely eliminated.

The price of this machine, as illustrated, is only $315.00. Equipped with low-down, gated batch hopper in place of the power charger, $246.00.

Fill in your name and address in the space below. Tear out the whole ad and mail to us, and without any obligation on your part, we'll send you our **special proposal** and Mixerette Booklet No. 115-A.

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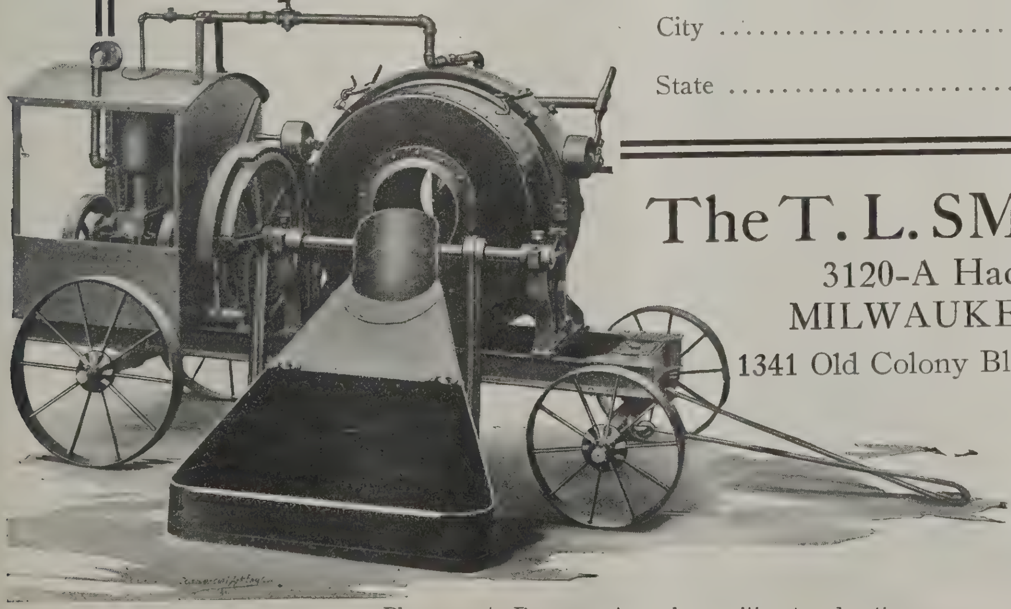

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Stanley's
Ornamental Surface Butts No. 165

Save Time and Labor and Please the Owner

The ornamental leaf screws on the surface of the door, saving half the time of mortising. The slotted ball tip can be unscrewed and the pin reversed so that the butt can be used on either right or left hand doors.

The handsome, dignified Beveled Edge design harmonizes with the popular designs of hardware. The Butts are made in all finishes. Packed with *oval head screws* which fit into the countersink and hold the door firmly. Round head screws will not hold the door securely in place, and if not screwed in straight will cause trouble. The screw head is liable to break or the head will meet the butt on an angle so that it is impossible to draw the butt tight to the door, making an unsightly appearance.

Write for booklet E, describing this and many other lines of "Stanley" Quality Hardware.

TRADE S.W. MARK **The Stanley Works** TRADE S.W. MARK
New Britain, Conn.

A Carpenter's "Right-Hand" Material

You always want your "right-hand" man on the job; to have the correct material handy for every job is often just as important.

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Compo-Board

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very useful in a multitude of ways. Beside its principal use as a wall board, nothing better can be found for

—lining garages or outdoor sheds for warmth
—lining summer cottages (it will help keep them cool)
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—enclosing rooms in attic or cellar
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—panels in wainscoting or beamed ceiling
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—in fact, you'll run into a job nearly every day that Compo-Board will help you do better and quicker

Sold by dealers almost everywhere, in strips 4 feet wide and up to 18 feet long. Write us for free sample and booklet—we'll tell you who handles it in your town.

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pot with a series of openings near the center and large openings at the top, and an outer pot of heavy steel. The heavy cast iron pot is surrounded by this steel jacket, forming an air heating chamber into which air is admitted and heated before being fed to and above the fuel, thus supplying the fire with heated air and bringing about, it is claimed, a consumption of fully 90 per cent. of the gases and smoke usually wasted. The furnace is built upon the steel fire pot, which leaves the cast iron one free to expand or contract without affecting the setting of the furnace. In the "New Idea" the air comes in contact only with the outer or steel fire pot, which is warm enough for good radiation but does not over-heat or burn the air. This, it is claimed, makes a much more sanitary furnace than is possible with a single fire pot. Another strong feature of a warm air furnace is the grate. In the "New Idea" the main grate is mounted on roller bearings, while the center grate drops for removing clinkers. Both can be replaced through the ash pit door by removing one bolt and one cotter pin. Another important feature in furnace construction is the radiator which, in the construction under discussion, is large, heavy, double and self-cleaning. The inner radiator is made of No. 10 annealed sheets and is joined to the cast head by means of a joint which the company has used for many years and which has given great satisfaction. The smoke flue projects to about the center of the radiator, thus drawing the heat equally to all sides of the radiator. The upper head, which is exposed to the direct rays of the fire, is made very heavy and is arched to allow for expansion. The furnace is referred to as being very durable and that soft coal, slack or screenings can be successfully used in it. At a very small additional expense a hot water attachment can be installed for heating water for bath rooms, etc.

Improvement in Floor Surfacing Machines

M. L. Schleuter, maker of the "Rapid" floor surfacing machines, 225 and 227 West Illinois street, Chicago, Ill., has recently added a new feature to his models. This consists of two carrying handles which are manufactured from strong tubing, so that two men can readily carry the machine from floor to floor with or without the motor. The handles are easily attachable, and as shown in Fig. 8 they allow the workmen plenty of freedom in handling the machine. The features of the "Rapid" floor surfacing machines are their substantial construction and efficient operation under all conditions. All parts are adjustable and the equipment of an adjustable wheel gauge allows for any depth of cut. These machines are made in three sizes, and a free trial is allowed on any one. An eight page booklet issued by the company contains full details regarding construction and operation, together with a keyed photograph to assist the buyer to understand the workings to the fullest extent. Copies of this interesting booklet may be had on application to the address given above.

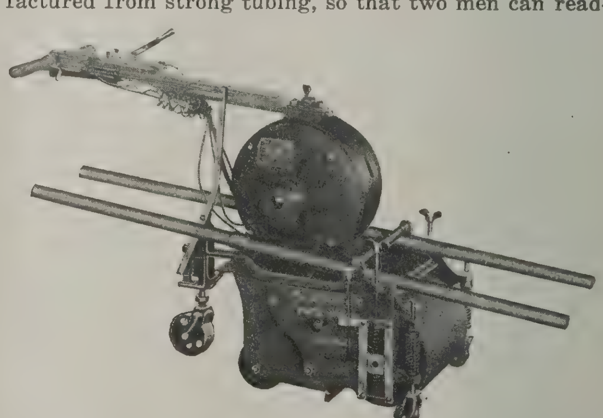

Fig. 8—General View of the Rapid Floor Surfacing Machine with Carrying Handles

The Little Giant Concrete Mixer

Some very interesting information from the standpoint of the building contractor who does more or less

(*Continued on page 78*)

IMPOSSIBLE for us to name in a few lines all of the good things we have in the way of the newest and best tools but you should know about

The celebrated Buck Brothers' Chisels and Gouges—ask for catalog No. 3199. The indispensable Jorgensen Adjustable Hand Screws—ask for circular No. 3200. The old reliable Colts Quick Acting Clamps—ask for catalog No. 3201. The genuine S. J. Addis London Carving Tools—ask for catalog No. 3202. Work Benches—ask for catalog No. 3203. Mitre Boxes—ask for catalog No. 3204.

We also carry regularly all the Yankee Tools, Stanley Rule and Level Co.'s and Miller Falls Lines, Hammond's Hammers and Hatchets, Russell Jennings' Bits, etc. You can purchase from us in one order all the best tools that the market offers. Correspondence invited.

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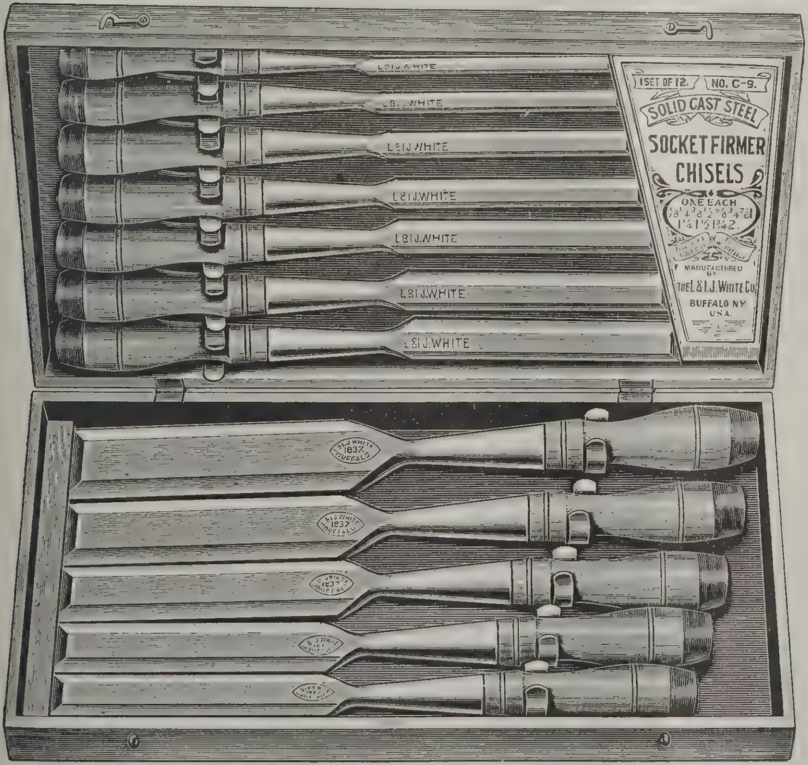
Fourth Avenue and 13th Street New York, Since 1848

Show This to Your Wife



Tell Her

It is what would just suit you for a Christmas present, and that you could use it for years.

If you haven't a wife, show it to "HER" or to anyone that wants to give you a dandy present that will last. You know every time you used it you would think of "Her." Be sure and tell her that.

To "HER"

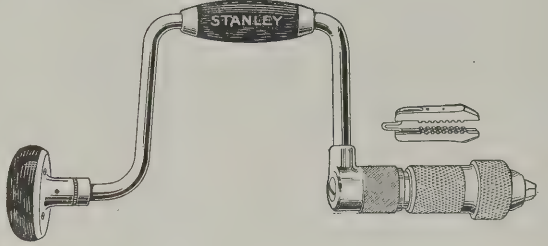
Every good workman thinks more of a set of good tools than anything else you could get him. He will be proud of this set, and you can just be sure that the whole neighborhood will know what he got; and then, these will last him a lifetime. Ask him about White Chisels—he knows.

We deliver these free, but in Canada you have to pay duty. Price for this set, with hardwood box, eight dollars. Leather Tip Handles.

We Sincerely Wish you a
MERRY CHRISTMAS

The L. & I. J. White Co.
100 Perry St., Buffalo, N. Y.

Stanley Tools



Stanley Bit Brace No. 811
A New Tool

The ratchet mechanism is of the well known Concealed Ratchet type, and the Brace is fitted with a ball-bearing chuck. The head is also ball bearing.

This is an exceptionally fine tool, both as regards construction and finish.

Full details of same will be furnished upon application.

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STANLEY RULE & LEVEL CO.
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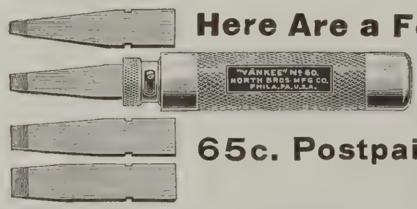
Try these for CHRISTMAS
"Yankee" Tools

are most interesting and useful tools. They appeal to men of every profession and calling, and a more suitable gift cannot be given. They last for years, and the memory of your little act of kindness returns every time they are used. There are 100 styles and sizes.

Here Are a Few


"YANKEE" No 60.
NORTH BROS MFG CO.
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65c. Postpaid

No. 60 A Pocket Screw Driver with 4 blades. Drives most any screw. Extra blades are carried in the handle. Fits the hand—fits the screws—fits the pocket—fits the purse—fit for any man.

No. 1530 $2.80 Postpaid

Takes any Round Drill Point up to ¼" diameter—has the celebrated "YANKEE" Double Ratchet for drilling in close quarters where a full revolution of the crank cannot be secured. A splendid tool for drilling small holes in wood or metal.

Better try them. Your dealers can supply you. ☞ Send for the "YANKEE" Tool Book anyway. A postal brings it.

NORTH BROS. MFG. CO.
Lehigh Ave. Philadelphia, Pa.

concrete work is contained in a 16-page pamphlet sent out by the Ballou Mfg. Company, Belding, Mich., and illustrating and describing the Little Giant Concrete Mixer. This machine embodies the three important essentials in a continuous mixer, namely, an accurately proportioning device; means for thoroughly blending the ingredients, and means for properly wetting the aggregates. The blending of materials is accomplished by the rotary motion of the mixing drum, thereby imitating the action of a rotary batch mixer. The drum is set at an angle of 13 degrees, and on the interior surface are ribs of angle iron which carry up and throw over the materials in a continuous stream. In this way every particle is "thrown, rolled and tumbled in a progressive spiral motion, while dry, as it passes through the drum—not pushed along by paddles in a trough." The wetting is done after the materials have been mixed dry, having passed two-thirds of the way down the drum, the water being introduced into the lower end through a pipe to a special spray. The volume is regulated by a valve. A flange in the lower end of the drum prevents premature discharge of both materials and water. A special scraper prevents the material adhering to the drum after it has been wet as it turns the materials over like a plow in the furrow, thus allowing the water to reach every particle. The Little Giant is made entirely of iron or steel, the frame being of trussed angle iron construction securely riveted at each joint.

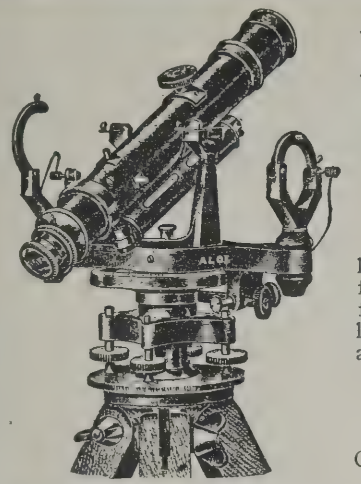
The "Cornell" Wall Board

The Cornell Wood Products Company, with offices in the Advertising Building, Chicago, Ill., claims the attention of the building contractor who is desirous of using a low cost wall covering as a substitute for lath and plaster. In "Cornell" board the company offers a high grade scientific product manufactured from a pure wood fibre which may be used for covering walls and ceilings in almost any kind of building. Its light weight makes the work easy to accomplish, and the flexibility allows its use in arched ceilings and cove work. This board is 3/16 in. thick and is supplied in two widths of 32 and 48 in., and in stock lengths from 6 to 16 ft. "Cornell" board is sized throughout and is guaranteed not to crack or chip. For its application on a new building it is nailed directly to the joists and studding, and in the case of repairs it is nailed to the woodwork through the old plaster. It is especially recommended by the makers where substantial partitions are wanted, and the fact that "Cornell" board is built of many layers of new wood fibres and waterproofed cement makes it a good insulator and sound deadener. On account of exceptional factory facilities the company is able to supply this high grade product at low cost. Its plant at Cornell, Wis., is said to be the only one in the world in which the entire process of wood fibre wall board manufacture is completed under one roof and under one management. The ownership of timber lands insures production limited only by capacity, and a force of skilled and experienced operators insures the manufacture of an excellent product. Readers of *The Building Age* can obtain samples of the wall board by writing the company.

Something About Rex Shingles

Some interesting information relative to the Rex Shingles, which are designed for use on different kinds of buildings ranging all the way from the inexpensive little cottage to the most pretentious mansion is contained in an attractive folder just issued from the press by the Flintkote Mfg. Company, 98 Pearl street, Boston, Mass., and with factory at Rutherford, N. J. The shingles in question are made of the best of felt, saturated and coated with high grade asphalt, thus rendering them waterproof and equally unaffected by extremes of heat and cold. The weather side of the shingle is surfaced with crushed slate, this being applied under pressure and rolled into the shingle until the whole becomes one compact sheet. The Rex Shingles are 9 in. wide, 12½ in. long and are exposed 4 in. to the weather, thus giving a solid three thickness roof throughout. The shingles are flexible and can be

(*Continued on page 80*)



Rent this Level 10 Months Then It's Yours

Builders and Contractors

This is not the old style Architect's Level. It is the newest 1915 model *convertible* level. There is not a single Builder or Contractor who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder or contractor can use the Convertible Level, sent free on request.

WARNING

The Level we offer is the new Aloe Convertible Level, 1915 model. Don't confuse the Convertible Level with the ordinary old style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified **transit** and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

A. S. Aloe Co., 625 Olive St., St. Louis, Mo.

COUPON

A. S. Aloe Co.,
625 Olive St., St. Louis, Mo.

Please send free instruction book on the use of the Convertible Level, 1915 Model, and complete details of your rental plan. This request in no way obligates me.

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B. A., Dec., '14.

SARGENT

OUR new Rafter Square, No. 500R, is the most complete Square ever made for the carpenter.

It contains accurate measurements for all kinds of rafters, common, hip, valley, jack and cripple—in the most convenient form.

These measurements are all given on the Square; they are complete, correct and final. They save the trouble of multiplying and dividing and then obtaining a result about which there is some doubt.

Simple and easy to use. A great time saver.

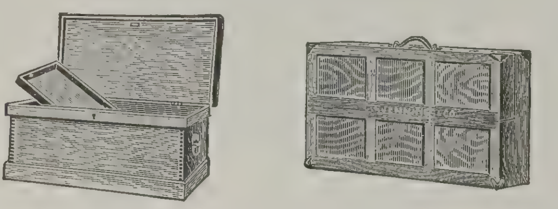
For full description and directions for using send for the Sargent Square booklet, free on request.

SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
1153 Leonard St. New York

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application.

Tool Chests, Tool Cases, Tool Cabinets, Tool Kits, Tool Outfits

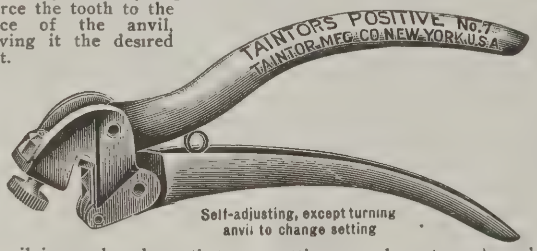
for the Carpenter, Electrician, Machinist, Householder and for the Great American Boy. We furnish them Empty and complete with Tools. The largest line of Tool Chests, etc. *"Made in America."*



C. E. JENNINGS & CO., 71-73 Murray Street, New York, U. S. A.

DO YOU WANT A SAW SET?

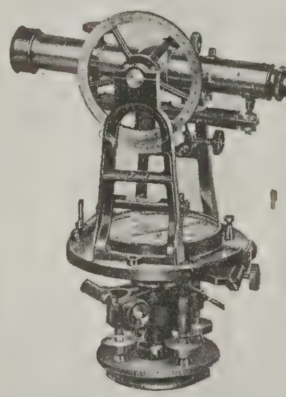
If so, get the one which by compressing the handles will clamp the saw against the side of the anvil, so it cannot slip; will then adjust the plunger to the thickness of the saw and then force the tooth to the face of the anvil, giving it the desired set.


TAINTOR'S POSITIVE No. 7
TAINTOR MFG. CO. NEW YORK, U.S.A.
Self-adjusting, except turning anvil to change setting

Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.
Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.
Send for our free booklet, "Suggestions on the Care of Saws."

Taintor Mfg. Co., 113 Chambers St., New York

Builders' Transit



Building requirements of to-day demand the use of an accurate instrument for plumbing walls; laying out and leveling foundations; locating stakes, etc. The Transit illustrated herewith is designed especially for the use of the Contractor and Builder. It is of light construction without sacrificing strength and rigidity. All of the necessary surveying connected with building operations can be done with this instrument at a great saving of time over the convertible Level because levels can be taken, horizontal and vertical angles can be read without the necessity of changing the instrument. We make this Transit in 4 styles and the price is well within the reach of all. Ask for illustrated catalog describing a large variety of Levels and Transits.

David White Co., (Inc.) 421 E. Water Street, Milwaukee, Wis.

Pearson's Automatic Shingle Nailer

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

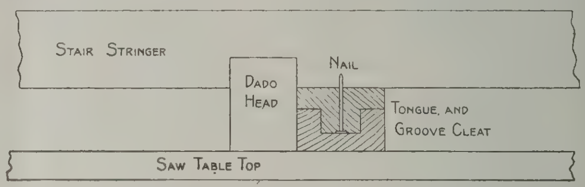
Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only $5.00 It makes good.

Pearson Mfg. Co.
Robbinsdale, Minnesota

easily fitted to curves and angles. They are furnished in red and green colors and as each and every shingle is exactly the same size no sorting or matching is necessary, this resulting in a great saving in the cost of laying. It requires 424 shingles to cover one square of roof surface and for shipment the shingles are packed in cartons containing 106 shingles or one-quarter square each. The circular also calls attention to the fact that the company makes Rex Slate Surfaced Roofing, red and green, this material being identically the same as Rex Shingles, but is sold in rolls. It is claimed to be suitable for use on all buildings where a colored roof is desired without the shingle effect.

The Huther Dado Head in Stair Construction

One of the many ways in which the Huther dado head may be utilized is in cutting stair stringers with taper grooves on an ordinary saw table. In doing this work it is only necessary to cut a tongue and groove joint in some suitable soft lumber and drive two nails through the tongue so that they will slightly protrude as shown in Fig. 9. Secure this tongue and groove cleat alongside the saw and stick the stair stringer on the nails as shown. Next run the groove to the circular holes and then groove again to the holes on an angle. Secure the angle by moving the stringer on the cleat. In Fig. 10 we show a section of a stair stringer in which the taper grooves have been cut by one of the Huther dado heads made by Huther Bros. Saw Mfg. Co., 2500 University avenue, Rochester, N. Y. The company states that it has received numerous sketches and samples of stair stringers from customers who have executed the work with the dado head on an ordinary saw table. The simplest method described was to use an ordinary saw table with a swivel cross-cut gauge, bore the round nose at the bottom of the groove first, then set the gauge at the right angle, making the parallel groove with one operation. After making the parallel groove the proper taper is produced by means of an extra operation, this being done by setting the swivel gauge at the different gauge and use an improvised gauge that anyone can make. One customer of the company claimed that he



The Huther Dado Head in Stair Construction—Fig. 9—Details of the "Jig" for Doing the Work

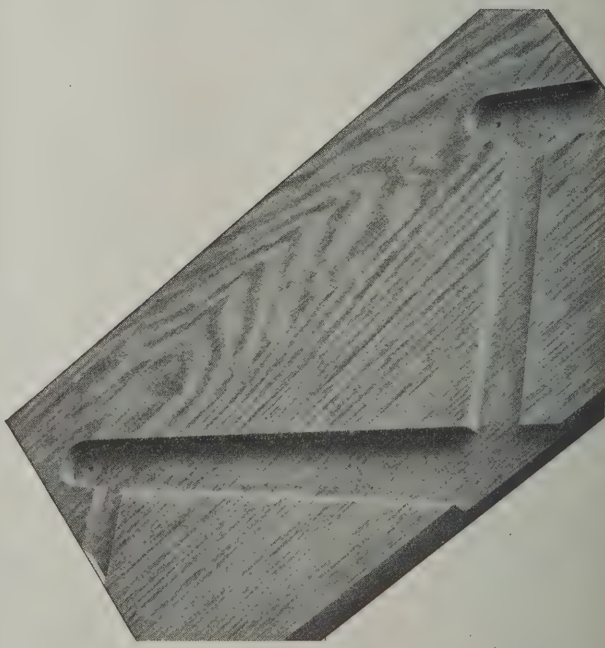
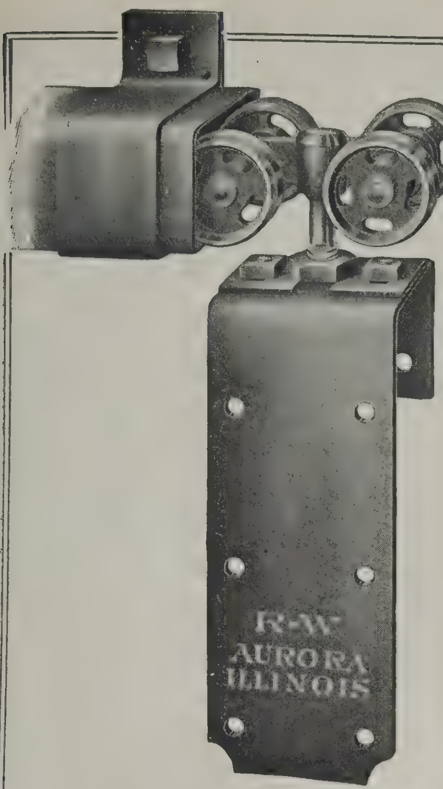


Fig. 10—Section of a Stair Stringer Showing Grooves Made by Dado Head

(*Continued on page 82*)



A New Field

With the multiplication of automobiles, there has come a multiplication of garages. Most car owners have a little garage of their own. A special type of door hanger is usually necessary owing to the large door opening needed and the lack of room for sliding.

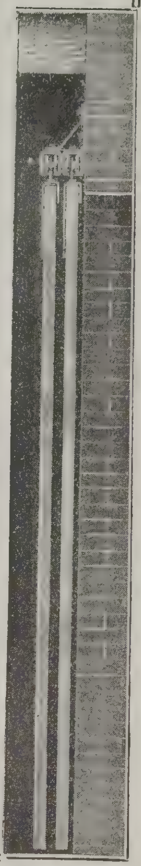
R-W Garage Hangers

Solve this most difficult problem and build up a big business by using R-W Garage Door Hangers.

There may be some door arrangement come up hard to figure out.

Put it up to us. Send us a rough sketch showing measurements, and we will be glad to tell you what is needed and where to get the hardware.

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.



The A-1 carpenter, craftsman or mechanic

Is the man who has good tools, knows how to use them and how to take care of them.

Carborundum Sharpening Stones

are found in the tool kits and on the work benches of thousands of just such workmen. Carborundum Stones cut quick and clean—they hold their shape, they last and they do not fill or glaze—there is a Carborundum stone for every sharpening need.

From your hardware dealer.

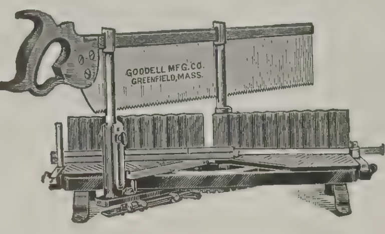
Let us send you complete catalog and "The Romance of Carborundum."

The Carborundum Company
Niagara Falls, N. Y.

Goodell Mitre Box

Made of STEEL—Cannot Break

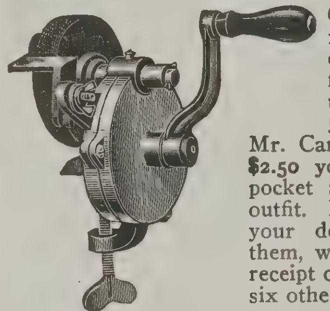
For years this Box has been recognized as being *first in quality and improvements,* and the new STEEL BOTTOM PLATES with ANGULAR SERRATURES to prevent the work from slipping add still more to its convenience and attractiveness.


GOODELL MFG. CO.
GREENFIELD, MASS.

Write for new *Circular K* describing this and many other features.

GOODELL MFG. CO.
Greenfield, Mass.

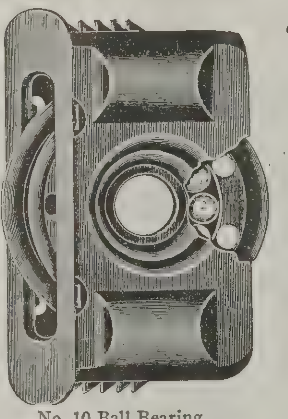
No. 0 PERFECTION



Our vest pocket edition for Carpenters, Plumbers and households; fitted with 4-inch Corundum Wheel. Weight 5 lbs.

Mr. Carpenter, just think for $2.50 you can carry in your pocket a complete sharpening outfit. No dirt—no grease. If your dealer does not carry them, we will send prepaid on receipt of price. We also make six other sizes.

STAR SPECIALTY MFG. CO.
227-233 W. Erie St., Chicago



"Grand Rapids" All Steel Sash Pulleys

Fasten automatically. No nails. No screws. Just bore 4 holes.

The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

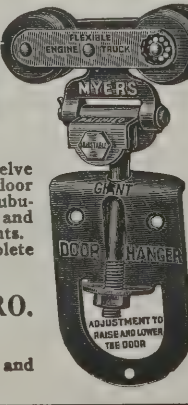
Write for free samples.

No. 10 Ball Bearing.

Grand Rapids Hardware Co., 160 Eleventh Street Grand Rapids, Mich.

THE MYERS GIANT DOOR HANGER
PATENTED

THE MYERS GIANT TUBULAR DOOR HANGER



This is one of twelve different styles of door hangers for flat or tubular track with lateral and perpendicular adjustments.
Write for our Complete Door Hanger Catalog.

F. E. MYERS & BRO.
ASHLAND, OHIO

The Ashland Pump and Hay Tool Works

could not get along without this dado in making stair stringers, as it requires but a short time to groove the whole stringer in a perfect manner. With the dado head the saw table does the work of two machines.

An Important Announcement

An announcement is made by the Triple "A" Machine Co., Room 326, 300 West Grand avenue, Chicago, Ill., that any reader of *The Building Age* who does not wish to buy one of the company's floor scrapers outright is given the opportunity of renting one of them for a month's trial. At the end of that time it is optional as to whether the machine is kept or returned. If the reader decides to keep the floor scraper the rental charge will be allowed on the purchase price, and the balance may be paid in 30 days. Under this ruling a special discount is allowed. The equipment consists of one Triple "A" spring driven floor smoother with automatic sandpapering attachment, together with six scraper blades, tool box, and five accessories. In the month's trial the user will find that he can do more than sufficient work to pay for the rental charges. Particulars of this advantageous offer may be had by writing the company at the given address.

A New Building Material Catalog

An excellently illustrated 250-page catalog containing description of 8,000 price-saving materials for building, repairing, remodeling, or improving the home, is being sent out to building contractors by the Chicago Millwork Supply Co., 1424 West 37th street, Chicago, Ill. In the introductory of this valuable edition, the company calls attention to the fact that every article described in the catalog will be supplied as represented. In the event of any misunderstanding the company guarantees to refund money unconditionally and to pay the freight on materials both ways. The catalog contains a department and a general index, and this arrangement helps the reader considerably in locating the materials on which information is desired. To building contractors contemplating the purchase of lumber and materials, the company recommends that its free book of house plans will save the reader considerable money by careful investigation. A letter to the company at the given address requesting catalog No. 313 will receive immediate attention.

Millers Falls Breast Drill No. 112

One of the latest additions to the long list of drills made by Millers Falls Company, Millers Falls, Mass., is the breast drill known as No. 112, which we illustrate in general view in Fig. 11. The tool is handsomely finished with malleable iron frame, japanned black, with the outside of the large gear painted gray with red stripe and the inside of the gear and under side of breast plate painted red. The crank is black, oxidized, and the chuck is polished. The tool has the appearance of costing much more than the price at which it is offered by the company. It is a breast drill reduced to its simplest form, the object being to produce a tool of the usual high standard of workmanship of the company but of a lower cost than other breast drills now on the market. In regard to the construction it may be stated that the breast plate is adjustable to different positions and is removable. The gears are cut, the small one being of steel and the ratio 3½ to 1. The diameter of the large gear is 4 in.; the thrust bearing is upon a hardened steel washer; the chuck is of the Barber improved type with alligator jaws made from forged bit-jaw steel, holding bit stock and many sizes of round shanks. The company points out that at increased cost

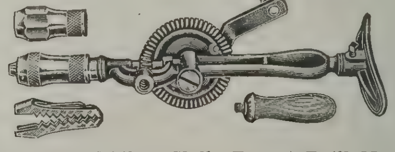
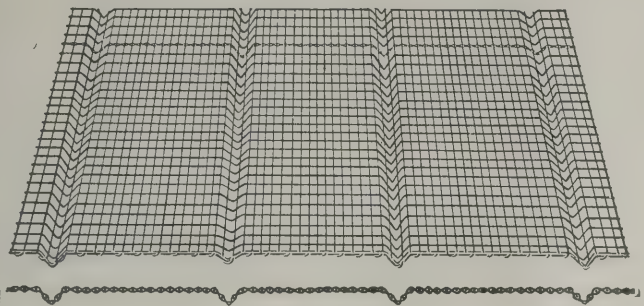


Fig. 11—The Millers Falls Breast Drill No. 112

(*Continued on page* 84)

Grimm's Galvanized Corrugated Wire Lathing



"Note the V"

(Pat. Applied for)

requires no furring on account of the V-shaped corrugations which are imbedded at intervals of seven inches.

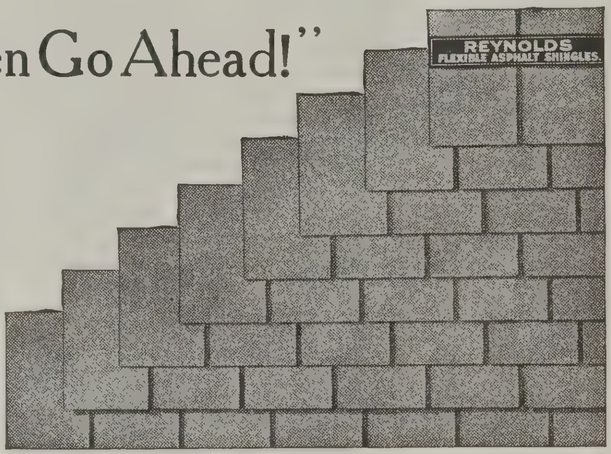
This feature alone is worth considering but that's not all. It WILL NOT RUST as it is heavily galvanized with the finest grade of Western Spelter and is much easier to handle and will conform to irregular curves much better than any other form of metal or wood lath.

Walls or ceilings plastered on this lathing WILL NOT CRACK OR DROP OFF, owing to its great keying qualities, which we will explain if you will drop us a card asking for our booklet No. 61.

Our general catalog will also be mailed free upon request, which describes our entire line, such as Greening's Patent Trussed Steel Wire Lathing, Buffalo Crimped Wire Concrete Reinforcing, Wire Cloth of all kinds and Wire and Artistic Metal Work for all purposes. DROP US A LINE AT ONCE.

BUFFALO WIRE WORKS CO.
(Formerly Scheeler's Sons),
MAIN OFFICE AND WORKS, 446 TERRACE, BUFFALO, N. Y.

"Be Sure You're Right—Then Go Ahead!"



To make sure Reynolds Asphalt Shingles were *right*—we tested them for 10 years before placing them on sale. The test proved they would not fade, split, crack, curl or go wrong in any way.

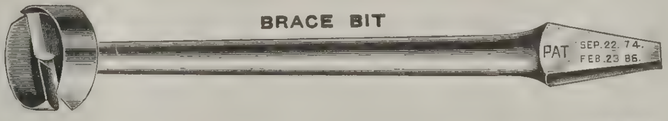
REYNOLDS SHINGLES come in four natural colors—Garnet, Red, Gray and Green. They make a roof beautiful in appearance, and no material known has given better satisfaction. Guaranteed for 10 years. They will outlive their guarantee in every instance.

H. M. Reynolds Asphalt Shingle Co.
West Grant Street, Grand Rapids, Mich.
Established 1868
Approved by the National Board of Fire Underwriters

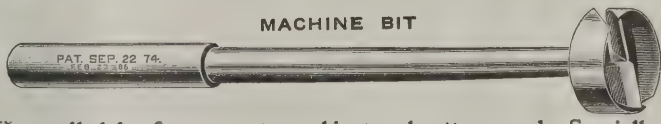
THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.

BRACE BIT


PAT SEP.22.74.
FEB.23.86.

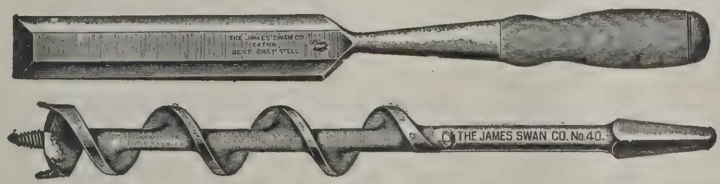
MACHINE BIT


PAT. SEP. 22 74.
FEB 23 86.

Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

LOOK FOR THE "SWAN" TRADE MARK

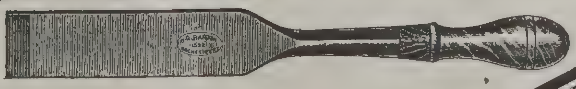

THE JAMES SWAN CO.
EXTRA
BEST CAST STEEL
THE JAMES SWAN CO. No.40.

On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY, Seymour, Conn.

MACK & CO. LTD.



The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

D.R. BARTON 1832 ROCHESTER N.Y.

Brown's Race
Rochester, N.Y.

HESS MEDICINE SANITARY CABINET LOCKER

The Only Modern, Sanitary STEEL Medicine Cabinet

The Recessed Steel Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

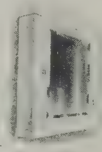
Costs Less Than Wood

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles — four sizes. To recess in wall or to hang outside.

Send for Illustrated Circular



The Outside Steel Cabinet

HESS, 1201-L Tacoma Building, CHICAGO
Makers of Steel Furnaces. Free Booklet

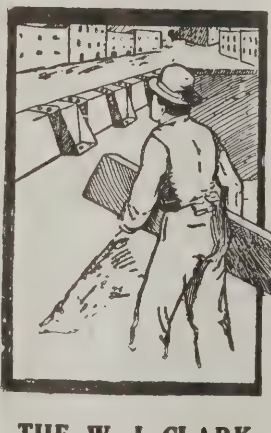
When a Wall Tie is a Wall Tie it is the Whalebone

Made in any length from five inches to fifteen inches. Standard size for Solid or Veneer walls 7 inches by ⅞ inches, weighing 50 pounds to the M. Packed 1000 to the box.

Price on standard size, based on 21 gauge material, $2.50 Pittsburgh per M. Shipments made same day order is received.

Can quote on lighter or heavier material if desired, as we can supply the Standard Whalebone in boxes weighing from 35 pound to M to 85 pound to M, according to thickness of material.

Allegheny Steel Band Co.
BELL PHONE: 718 Cedar North Side: PITTSBURGH, PA.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

Saved $7 to $10 per M

Got Better Lumber

Gentlemen: Hamburg, Minn.

I have just unloaded my car of H-L-F lumber and millwork that I bought of you, and will say that I never have seen any lumber and millwork that will compare with yours, and the saving in price is from $7.00 to $10.00 per M with all freight charges paid.

WM. ZUM HOFE.

Think of making $130 extra profit on just *one job!* That's what buying of H-L-F will do for you, too.

Get H-L-F prices on your jobs

make *doubled* profits. Write today for the H-L-F House Pricer. Outline the kind of house wanted. Answer a few simple questions, get our price (freight paid, no extras, guaranteed) without figuring bill of materials.

Write today for the H-L-F House Pricer (free), H-L-F Plan Book (10c), Barn Folder (4c), Millwork Catalog (free), Silo Folder (free).

THE HEWITT-LEA-FUNCK CO., 459 Crary Building, Seattle, Wash.

octagon shells can be supplied in place of the regular Barber shells and extra jaws for small sizes of round shanks are also supplied at small cost. The drill is 15 in. in length, weighs 4 lb., and is sent out packed in a pasteboard box.

Where the Sounding Board was Valueless

It is stated that the Amasa Stone Memorial Chapel of Adelbert College has, since its erection in 1910, proven unsatisfactory acoustically, the general shape of the building being a long and narrow rectangle measuring 140 x 30 ft. Various experiments showed the difficulty to be due to general reverberation. It was suggested that a sounding board be installed to overcome the trouble, and Professor Whitman, of the Western Reserve University, undertook a series of experiments to determine as accurately as possible just what benefit would be secured by this means. The final comparative test was made first *without* and then *with* the use of the sounding board. The results showed that the greatest benefit obtained by the use of the sounding board was to make the hearing 2 per cent. better in some parts of the building under certain conditions, while it actually made hearing less easy in the gallery. Professor Whitman showed that for all practical purposes the sounding board was useless. The H. W. Johns-Manville Company was then asked to undertake the correction of the chapel by its system based on the scientific researches of Prof. W. C. Sabine, of Harvard University. Its acoustical treatment was applied to the ceiling panels and upper walls and resulted in the elimination of all the acoustical defects.

The Wallace Bench Planer

One of the latest candidates for popular favor in the way of a bench planer is the little machine which is being introduced to the attention of carpenters and builders by J. D. Wallace, 527 West Van Buren Street, Chicago, Ill., and shown in operation in Fig. 12. This is a portable power planer which weighs only 50 lb. including its direct-connected electric motor. It will be observed that the planer stands on the bench without fastening and can be operated from an electric light socket. It is furnished with either direct or alternating current motor, although if desired it can be arranged for belt drive from a counter-shaft. It is of such a nature that it can be carried directly to the job and put into operation at a moment's notice. The planer is said to take the heaviest cuts in hard as well as in soft wood and in addition will take a fine cut that will not show the knife marks. Its fence is adjustable to any angle and the table to any depth of cut. Its cutting knives are 4 in. wide, but by removing the fence,

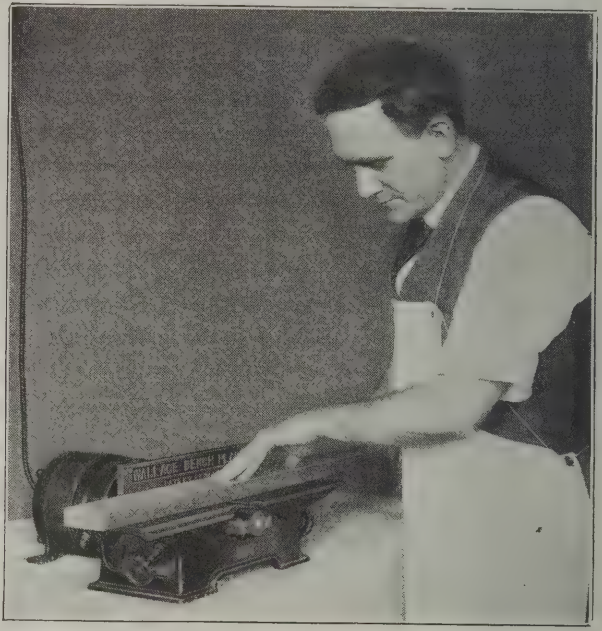


Fig. 12—The Wallace Bench Planer in Actual Use

(*Continued on page 86*)

Plastergon Solves the "Winter Work Problems"

This moving picture house was built in the Winter by Joe Eisenhaur at a profit of $115 more than if lath and plaster were used.

PLASTERGON
TREATED WOOD FIBRE
WALL-BOARD

"EVERY PANEL GUARANTEED"

The same success and profit is open to all who use Plastergon because it is the only high-quality, all wood fibre wall board selling at a reasonable figure.

WHEN BETTER BOARD IS MADE, WE'LL MAKE IT.

Take our samples and prices to your customers and you'll get the job.

PLASTERGON WALL BOARD CO., 102 Fillmore Avenue, Tonawanda, N. Y.

The best Brace ever made

If you want a brace that will give you absolute satisfaction, last a lifetime, and be the envy of all your fellow workmen, ask your dealer for

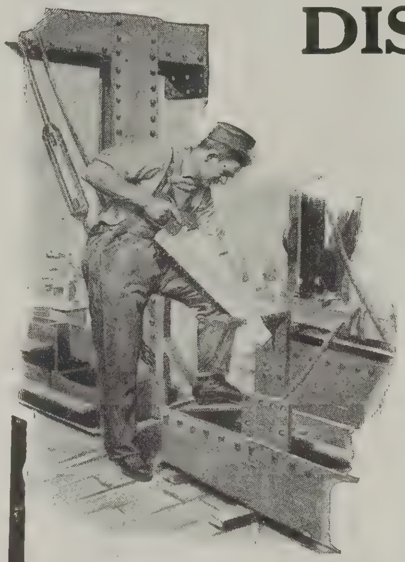
MILLERS FALLS BIT BRACE No.872

The two forged steel jaws sit in an unbreakable socket made from bar steel. Jaws have four longitudinal millings which give powerful grip for their whole length on any bit, round or taper. Round shanks from 1/8 to 1/2 inch in diameter, No. 1 Morse taper and all sizes of bit stock and expansion bit shanks may be accurately centered. Ball-bearing shell with case-hardened hood gives an extra grip. Head and sweep handle also ball-bearing. Patent cup washer holds chuck to sweep without working loose. A brace of great superiority costing very little more than the ordinary kind.

Ask your dealer to show you this brace and these two other new Millers Falls Tools—Extension Bit Holder 6 and Hand Drill 1980. Send for pocket catalog showing complete line.

MILLERS FALLS COMPANY
Millers Falls, - - Mass.

MILLERS FALLS TOOLS



DISSTON Hand Hack Saw for cutting metal

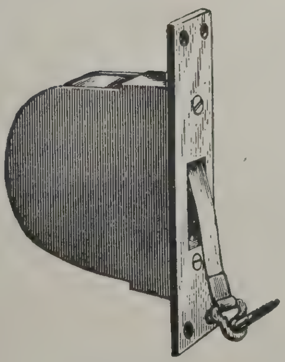
This saw has the same form as an ordinary hand saw, but is given a special temper for cutting metal. It is hollow ground for clearance, the teeth having no set.

Structural iron workers find it useful in places and positions where the ordinary hack frame could not be employed. For metal cutting of any kind where deep cuts are necessary, or where the use of one hand is desirable, this saw is unexcelled.

Send for circular

Henry Disston & Sons, Inc.
Keystone Saw, Tool, Steel & File Works
Philadelphia, U. S. A.

Caldwell Sash Balance



Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

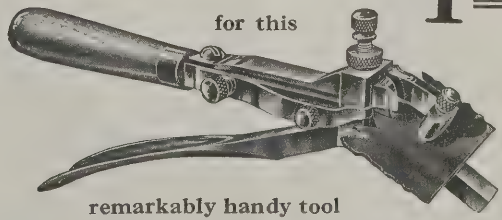
Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

CALDWELL MFG. CO.
5 Jones St., Rochester, N.Y.

SEND $1.00 for this



remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending $1.00 for this attractive offer. We prepay postage.

Otis A. Smith Rockfall, Conn.

The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.

Sash Chains

Cable Chains

Jack Chains

Manufacturers of "GIANT METAL" Sash Chains

Manufacturers of "RED METAL" Sash Chains, Cable Chains, Jack Chains, Bell Hangers' Chains and Plumbers' Chains. Made in Brass, Copper and Steel.

WRITE FOR CATALOGUES AND PRICES.

We are the ORIGINATORS of SASH CHAIN as SUBSTITUTE for sash cord. In use over thirty years. Capacity of our chain plant 30 miles per day.

COPPER CABLE SASH CHAIN

Thomas Morton
245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS

CHAINS
For Suspending Heavy Doors, Gates, Etc.

All of SUPERIOR QUALITY

CHAMPION METAL SASH CHAIN

You needn't have your best mechanic do the siding if you use

Kees Metal Building Corners

—and you get a better job than your best man could do. Make us prove it. Write for free samples today.

F.D. KEES MFG. CO. BEATRICE, NEB Box 812

THE YANKEE
Compound Level

Just the Thing for a Builder
Accurate—Low Priced

FROST-ADAMS CO.
Cornhill, Boston
Send for our catalogue

THERE'S no possible chance for confusion and misunderstanding about

DIXON'S SILICA GRAPHITE PAINT

It is made in *one quality* only—four colors —fifty years. Booklet 32-B.

Made in Jersey City, N. J.
Joseph Dixon Crucible Co.,
Established 1827

DIXON'S SILICA-GRAPHITE PAINT FOUR COLORS JOSEPH DIXON CRUCIBLE CO. JERSEY CITY, N.J.

stock up to 12 in. wide can be roughed off. The cutter head is cylindrical and the throat opening averages only 1 in. in width—half the usual size. The device is a planer pure and simple, there being no attachments for doing other work. Mr. Wallace, the manufacturer, makes the prediction that before another season is over this bench planer will be considered as necessary to a carpenter and builder as a try square and will eventually eliminate the hand plane from the tool kit.

A Real Christmas Present for Any Little Girl

We have just learned that the Neponset House which is sold by Bird & Son as an advertisement of their business was really designed by one of the leading architects of the United States. It is an exact reproduction of an old Colonial house, white in color, with green blinds and solid red chimney. The back is open like any doll house, making it a useful as well as an attractive and ornamental toy. On one of the wooden sills there is tacked a tiny name-plate, "The Neponset House," but outside of this the house is not marred in any way by advertising. The house is shipped all taken down and packed flat in a strong Neponset Fibre Case complete for $3.00. Everything for putting it together is included so that the purchaser need supply only the hammer. The assembling of it is great fun for the old people and can be done in from fifteen minutes to half an hour. The dimensions are 2 ft. 6 in. long by 1 ft. 3 in. wide by 1 ft. 7 in. high. Many Neponset dealers are carrying a stock of these houses or they can be obtained direct from Bird & Son, East Walpole, Mass.

An Attractive Offer to Carpenters and Builders

The Pearson Mfg. Company, Robbinsdale, Minn., makes an attractive announcement to the effect that any carpenter or builder sending $5 for the nailer or tacker will find with the shipment a useful present in the shape of a fine carborundum pocket knife and chisel sharpener with round corners. The company is constantly in receipt of letters from appreciative users of the nailers, one builder stating that the only trouble he found with the use of the shingle nailer was to get a man who could lay the shingles as fast as he (the builder) could nail them.

TRADE NOTES

The International Correspondence Schools, Box 969, Scranton, Pa., are sending out a four page illustrated folder calling attention to the merits of these schools educationally, financially, and industrially. Extracts are given from local newspapers relating to the schools and one page is devoted to statements and statistics showing what the schools mean to the City of Scranton.

E. T. Huddleston has opened an office for the practice of architecture in connection with his work as head of the Department of Drawing at New Hampshire College, Durham, N. H., and desires to secure manufacturers' catalogues and samples.

As a supplement to the October issue of "Graphite," the Joseph Dixon Crucible Company, Jersey City, N. J., published the Atlantic City Steel-Fence Paint Tests, the report concerning which was presented at the annual meeting of the American Society for Testing Materials held in Atlantic City the past summer.

The card calendar for November sent out by the Richards-Wilcox Mfg. Company, Aurora, Ill., is one of the most attractive of the series. The panel picture bears the title "Leadership," and the significance of this is found upon the back of the card in its reference to the R-W House Door Hangers which the company manufactures to meet many requirements.

The Universal Portland Cement Company, Chicago, Ill., is distributing throughout the farming districts of the country a large poster bound at top and bottom with metal strips and provided with a metal eye for hanging it up upon the wall in some conspicuous place. Upon it is a picture of liberal proportions of a member of the rodent family. This is accompanied by the

(*Continued on page 88*)

WEATHER VANES

ALL SIZES
AND
DESIGNS

SEND FOR
CATALOGUE

E. G. Washburne & Co.
208 Fulton Street
New York

LUMBER SNAP

Your bills of lumber and building material received during month of December will be figured at lowest prices ever made on high grade brand new stock. Never in our entire history have we been situated to quote such low prices.

Through 22 years of our successful growth we have never found it necessary to recognize any competition in high-grade, brand new building material. Proof of this statement is given by our already large and rapidly increasing lists of satisfied patrons. **Send us your lumber bills today for low December figures.** Upwards of 20 million feet of up grade lumber always on hand, suitable for all work. Also doors, windows, frames, cabinet work, interior finish and all building material at lowest of low prices.

THESE SPLENDID BOOKS ARE FREE

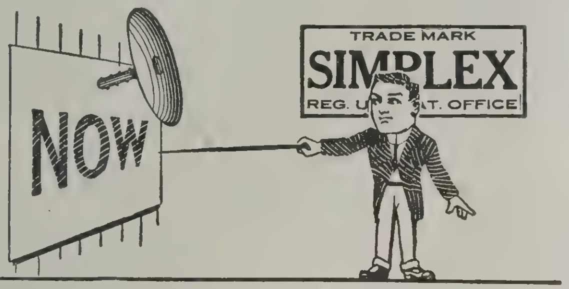
$10,000.00 Plan Book of 100 modern Harris homes, barns and other buildings profusely illustrated with floor plans. Outlines of our unbeatable home building proposition. Ask for Plan Book C-154.

Building Material Book. The greatest carpenters' and builders' buying guide ever published. A wide range of bargains in doors, cabinet work, siding, flooring, interior finish, etc. Ask for Catalog C-154½.

Half Price Pre-inventory List of Odds and Ends Now Ready. Ask For List No. C.-154¾.

HARRIS BROTHERS CO., 35th & Iron Sts.
CHICAGO

BETTER ROOFS and BIGGER PROFITS

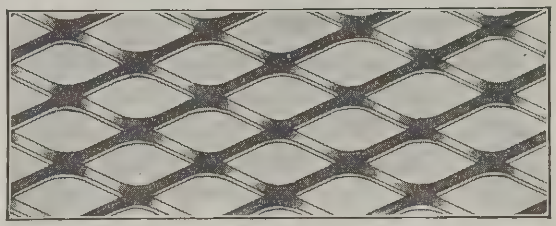


Send for free samples of

SIMPLEX ROOFING NAILS

H. B. SHERMAN MFG. CO. Battle Creek, Mich.

Berger's Metal Lath



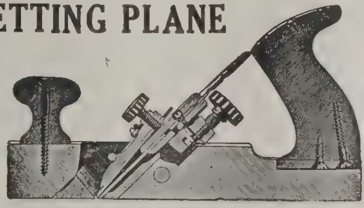
Write for catalog

The Berger Mfg. Co., Canton, Ohio

New York, St. Louis, Boston, Chicago, Philadelphia, Minneapolis, San Francisco, Cincinnati

ONLY SELF-SETTING PLANE

Sent on trial as per circular. Our $1.00 certificate if you mention this paper.



GAGE TOOL CO.
Vineland, N. J.

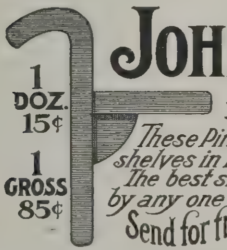
RELIABLE
FOLDING
Scaffold Bracket

Strong and safe; requires only a few minutes to attach. No holes to bore. Four 10-d or 16-d nails fasten them securely. Positively rigid; no vibration.

The Price of these Brackets can be saved in time and material on the first two jobs.

Write for Circular C.

ELITE MFG. CO., Ashland, O.



1 DOZ. 15¢
1 GROSS 85¢

JOHNSTON'S *Patent*
SHELF PIN

These Pins are used for supporting movable shelves in Book Cases. Cannot fall out or sag down. The best shelf pin made. Easily put in place by any one.

Send for free sample to **J. D. JOHNSTON,**
NEWPORT, R. I.

1853 BUCK BROS. 1914

BUCK BROS

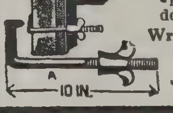
Buck Brothers' Tools are LASTING tools—they keep their edge.

We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

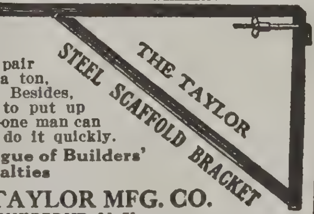
BUCK BROS., Millbury, Mass.

$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)

ABSOLUTELY SAFE for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



Write for Catalogue of Builders' Specialties

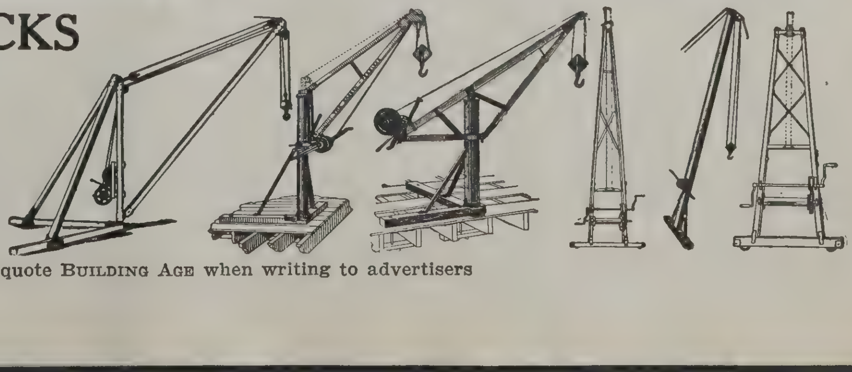


JAMES L. TAYLOR MFG. CO.
POUGHKEEPSIE, N. Y.

BUILDERS' DERRICKS
FOR ALL REQUIREMENTS

SATISFACTION GUARANTEED

We Make Prompt Shipment. Write for Illustrated Circular "A" with Prices



SASGEN DERRICK CO.
2057 N. Racine Ave., CHICAGO, ILL.

WE'LL GIVE YOU A COPY OF THIS BOOK

SYKES
Complete Specifications for Stucco on
METAL LATH
The Sykes Metal Lath & Roofing Co.

Every contractor, builder, dealer or owner should have a copy of these specifications. They save time and labor, and cover thoroughly every point, having been prepared by experts. To contractors, builders, dealers, etc., we will furnish these booklets free. Write us today for a copy which will be mailed to you promptly.

EXPANDED CUP
SYKES METAL LATH
EST. 1877 **SELF – FURRING**

This Lath is ideal for stucco purposes, because it is Self Furring. Mortar will get a perfect clinch when lath is fastened direct to sheathing boards or where passing over wood studs or other obstructions, making a saving in this class of construction of from 4 to 5 cents per square yard over Metal Laths that require furring strips. Sykes' expanded cup metal lath is the best possible for outside or stucco work, but is equally as good for inside work. However, if you prefer a sheet lath, we make—

Sykes Trough Sheet Lath, for ceilings, inside walls, mantel and tile setting, etc. Furnished in either anti-rust (oil) coating, painted black or galvanized. Write us for prices and free samples.

Sykes Wall Ties—Standard, 7 in. long—Sykes Veneer Wall Ties, 6 in. long; extra heavy, galvanized, with cross corrugation. Free samples.

Sykes Corner Beads—6, 7, 8, 9 and 10 feet lengths. Ten pieces to the bundle. Write us for prices.

The Sykes Metal Lath & Roofing Co.
494 Walnut Street, Niles, Ohio

Use Con-Ser-Tex on Every Job

The owner whose home has a CON-SER-TEX roof will always be grateful to the carpenter or builder who recommended it.

CON-SER-TEX is weather proof. It is easy to lay. It never rots or stretches. It hugs the roof or roof surface tightly. It makes a handsomer roof than wooden shingles, slate or tile, and is more economical.

The scientific chemical treatment of CON-SER-TEX makes it practically proof against deterioration. It gives lasting protection under all conditions of weather and climate.

Write for Sample and Complete Information

WILLIAM L. BARRELL CO.
8 Thomas Street New York City

Chicago Distributors:
Geo. B. Carpenter & Co.,
430-4 Wells Street

California Distributer:
The Pacific Building Mat. Co.,
San Francisco

Waterhourse & Price Co., Los Angeles

statement that "Rats destroy property, kill stock and spread disease. Stop them by building floors, corn cribs, silos, foundations, barns, etc., of concrete." The reason for the recommendation is that concrete structures are rat-proof, fireproof, sanitary and will endure for all time.

Ford Mfg. Company, Ellicott Square, Buffalo, N. Y., is distributing an illustrated folder relating to its Gal-va-nite roofings, flooring, felts, asphalt, coal tar products, etc. Some of the illustrations show the sure and easy method of laying Gal-va-nite roofing and with the folder is a sample of the roof covering in question.

"Graphite" for November deals with the usual quota of interesting matter relating to Dixon's Graphite productions. The frontispiece represents a young lady seated at a table and writing a letter, in which she is made to say that "Thoughts are best expressed through the medium of a Dixon's Anglo-Saxon pencil. I say Anglo-Saxon because thoughts are too valuable to be interrupted, and time too precious to be lost in sharpening a poor pencil. Hence the use of my Dixon's to tell you * * *" A short article in the body of the issue tells "How Pencils Sold Cash Registers," and another short article refers to the fact that Christian Voegler has rounded out 50 years of faithful service with the Joseph Dixon Crucible Company, Jersey City, N. J., and in recognition of the occasion Mr. Voegler, who is foreman in the stove polish department, was presented with $100 in gold and an engrossed letter from President George T. Smith.

"Roofrite Shingles" is the title of an attractive four-page folder which is being sent out by W. C. Hopson Company, Grand Rapids, Mich. These shingles are made of a soft annealed metal and the galvanized coating is very carefully applied. It is so prepared that it fuses with the basic metal, thus providing, it is claimed, a rust-proof surface of great durability. They are not affected by moisture and the fire protection which the shingles afford is an important factor. Sparks or brands falling upon a roof covered with this material cannot ignite it or damage its efficiency.

Hunkins-Willis Lime & Cement Company, 902-906 Century Building, St. Louis, Mo., has distributed a folder calling attention to the various specialties which it is prepared to furnish builders and contractors. Reference is made to reinforcing steel bars, round, square, twisted and deformed; also to spiral expanded metal lath, channels, angles, triangle mesh concrete reinforcing. The company states that in exploiting the sale of materials mentioned in the folder it became necessary to organize an engineering department in conjunction with its Specialty Department.

Fiberlic building board for interior construction is one of the latest candidates for popular favor among those connected with the building industry. It is made from a wiry interlacing mass of chemically treated root fiber and is produced in thicknesses of 1/8, 1/4 and 1/2 in. The manufacturers, MacAndrews & Forbes Company, Jefferson Street, Camden, N. J., will send samples of the material to carpenters and builders who may make request for them.

Greenlee Bros. & Co., Rockford, Ill., are distributing a booklet entitled "The Forging of an Auger Bit," which we understand is the first of a series of six illustrated descriptive pamphlets on the subject of the manufacture of auger bits.

The North American Construction Company, makers of Aladdin portable houses, Bay City, Mich., is adding to its facilities by the erection of a factory building 96 x 256 ft. in plan and two stories in hight.

The business of the up-to-date builder and contractor involves no little clerical work in order to keep things straight and his office equipment usually includes among other labor-saving devices a modern typewriter. Those who have not yet installed a machine of this kind in their offices are likely to be interested in the announcement of the Typewriters' Distributing Syndicate, 166-Y20 North Michigan Boulevard, Chicago, Ill., relative to the Model No. 5 Oliver with in-built tabulator and visible writing. It is stated that the machine will be sent on free trial and the price with catalogue can be obtained by writing to the address given.

CONTAINING COLORED SUPPLEMENT WITH PLANS

BUILDING AGE

DECEMBER, 1914
PRICE 20 CENTS

You can have a permanent
RED OR GREEN ROOF
at reasonable cost by using

Hudson Asphalt Shingles

Beautiful in appearance. They can't rot or fade, being surfaced with crushed slate in all its natural colors. Neither Paint nor Stain is required. Easy to Lay and Inexpensive. For any house or building where shingles are suitable. Can be used for siding also. Send for samples.

ASPHALT READY ROOFING CO.
9 Church St., New York, N. Y.

I'll Protect Your Concrete Cement or Stucco House Against Dampness

One coat of BAY STATE BRICK & CEMENT COATING will waterproof all concrete and cement surfaces without destroying the distinctive texture of the Cement. It becomes a part of the material over which it is applied and affords lasting protection to the structure; preventing discoloration of interior and exterior surfaces caused by moisture corroding the metal lathing.

Send for Booklet 19 which contains complete information on the subject of waterproofing and decorating Concrete surfaces.

Wadsworth, Howland & Co.
Incorporated
Paint and Varnish Makers and Lead Corroders
Boston, Mass.

ATTENTION

Carpenter Contractors

Keep busy during the winter months laying Wood-Mosaic Floors of Hardwood. Large quantities of our flooring are laid in old houses as well as new. We make all kinds and thicknesses: Wood-Carpet, Strips, Plain and Ornamental Parquetry.

We will furnish without charge, on receipt of accurate measurements of rooms, colored sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for catalogue and a free copy of our Book "Wood-Mosaic Floors."

Catalogued in Sweet's Index.

Wood-Mosaic Company
32 Hebard St., Rochester, N. Y.

Saw Mill and Flooring Factory: New Albany, Ind.
Sales Office and Flooring Factory: Rochester, N. Y.

water proof

PARADUX

A waterproof canvas roofing or decking that is easy to lay and economical.

The wearing surface is a heavy high grade canvas, and can be painted any color desired.

This canvas is backed with a waterproof felt which acts as a cushion and at the same time eliminates the necessity of using white lead, etc., which is necessary in the application of plain canvas.

The ideal material for sleeping porches, piazzas, roof gardens, boat decks, etc., or any surface on which walking will be done.

Send for samples, prices and full information.

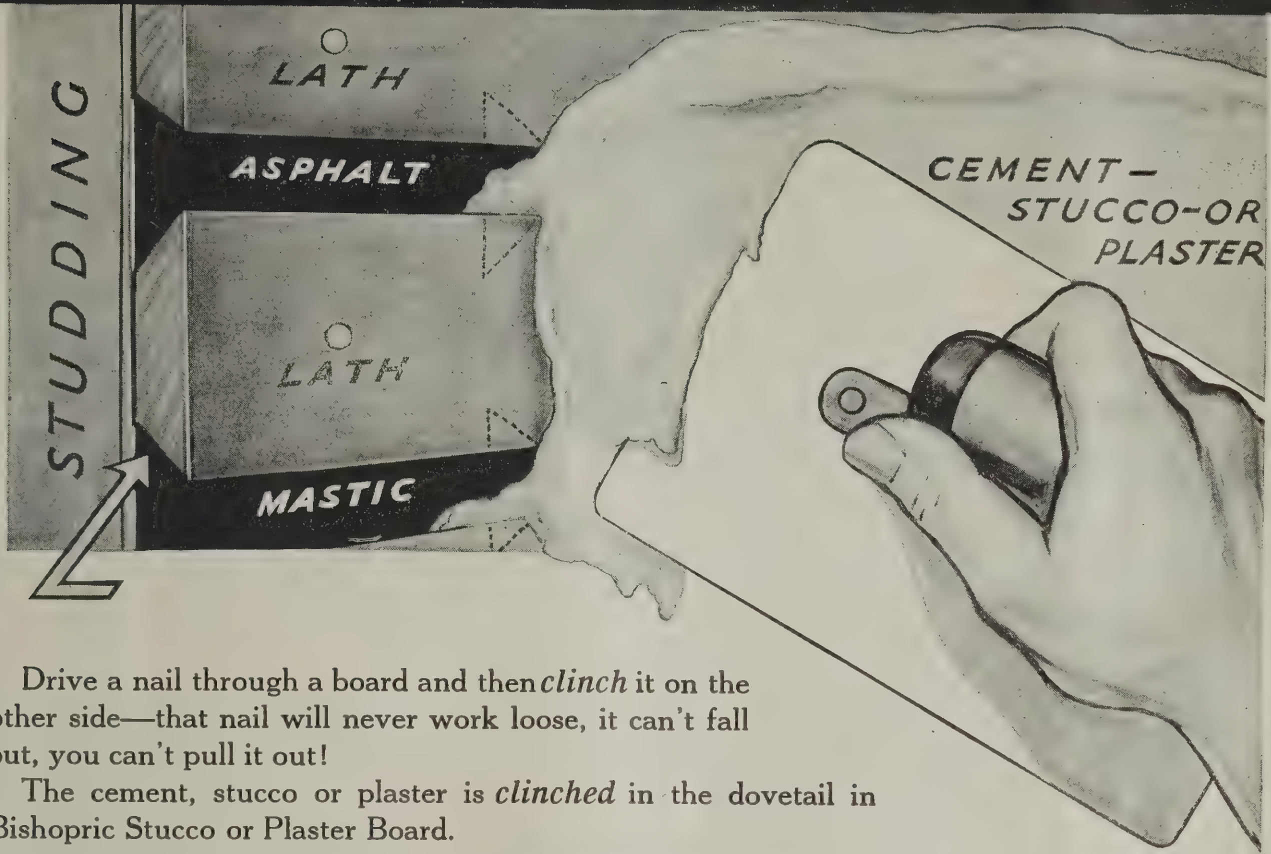
Flintkote Manufacturing Company, Inc.

98 Pearl Street
Boston, Mass.

651 Peoples Gas Bldg.
Chicago, Ill.

Manufacturers of REX-TILE—*the warpless shingle*—for residences, bungalows, cottages, etc.

THE DOVETAILED LATH



Drive a nail through a board and then *clinch* it on the other side—that nail will never work loose, it can't fall out, you can't pull it out!

The cement, stucco or plaster is *clinched* in the dovetail in Bishopric Stucco or Plaster Board.

THE DOVETAILED KEY "LOCKS THE PLASTER"
BISHOPRIC
STUCCO OR PLASTER
TRADE-MARK BOARD REGISTERED

"Built on the Wisdom of Ages"

It can't work loose, fall out or crack or crumble. *It's there to stay!*

The principle of the dovetail joint is *centuries old*—as old as the art of building—and as effective as it is old.

It's this *combination* of old, time-tested principles and materials forming a modern building product that accounts for the reliability and superiority of Bishopric Stucco or Plaster Board. There's nothing about it that every architect, builder, mechanic or carpenter will not pronounce *absolutely dependable* and *best adapted* to the purpose intended.

The creosoted lath that withstands all exposure, that does not swell, shrink or warp — the Asphalt Mastic that is moisture and vermin proof—the sized fibre board that protects against heat and cold and effectively deadens sounds; all these have been used separately for ages.

And now, united in Bishopric Board, they form a background for Stucco or Plaster that is proof against cracking or crumbling, dampness or changes in temperature, that lasts as long as the house and always looks artistic.

There is *no metal* in Bishopric Board to *rust* and *break away from its fastenings*

Bishopric Stucco or Plaster Board costs *less* than other backgrounds and saves in both material and labor. From *any* and *every* viewpoint it's an *economical* proposition.

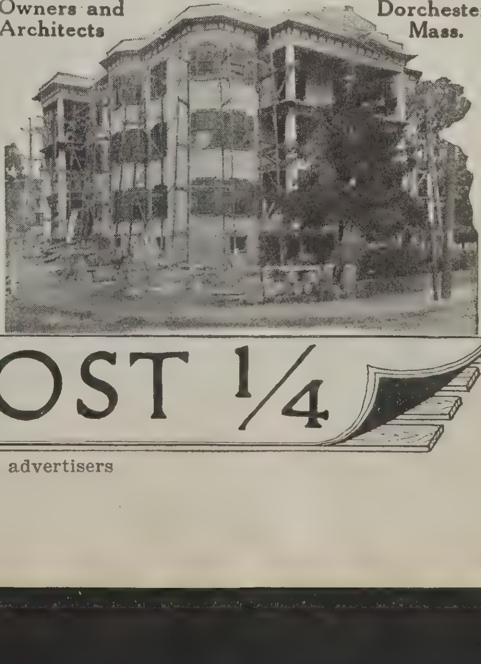
Our free book "Durable Homes by the Bishopric System" illustrates homes, apartments, factory and public buildings on which Bishopric Board has been used. It contains letters from builders, architects and users, and furnishes facts and figures to prove that Bishopric Board cuts the cost at least 25%.

Don't take our word for this—investigate for yourself—be convinced!

Send today for book and free samples of Bishopric Stucco or Plaster Board.

The Mastic Wall Board & Roofing Co.
612 Este Avenue, CINCINNATI, OHIO
CENTRAL DOOR & LUMBER CO., Portland, Oreg.
Licensed Manufacturers and Distributors for Pacific Slope

Built with Bishopric Stucco Board
Robert Hamilton and J. C. Cameron
Owners and Architects
Dorchester, Mass.



CUTS THE COST 1/4

The FAMOUS "31"

Universal Woodworker

More than 2,000 Carpenters and Builders have installed this wonderfull time-saving machine in their shops and mills. Some are *large* Carpenters and Builders—others *small,* but the point is—all are now saving from 50 to 100% on their carpentry and millwork.

The FAMOUS "31" Universal Woodworker actually does thirty-one different kinds of work. Think what separate machines for doing these various classes of work would cost you! Think how much *lower* you could estimate on lots of work by using this machine. Parts that you now have made for you, you could make yourself. Does first-class work in every particular. Fully guaranteed.

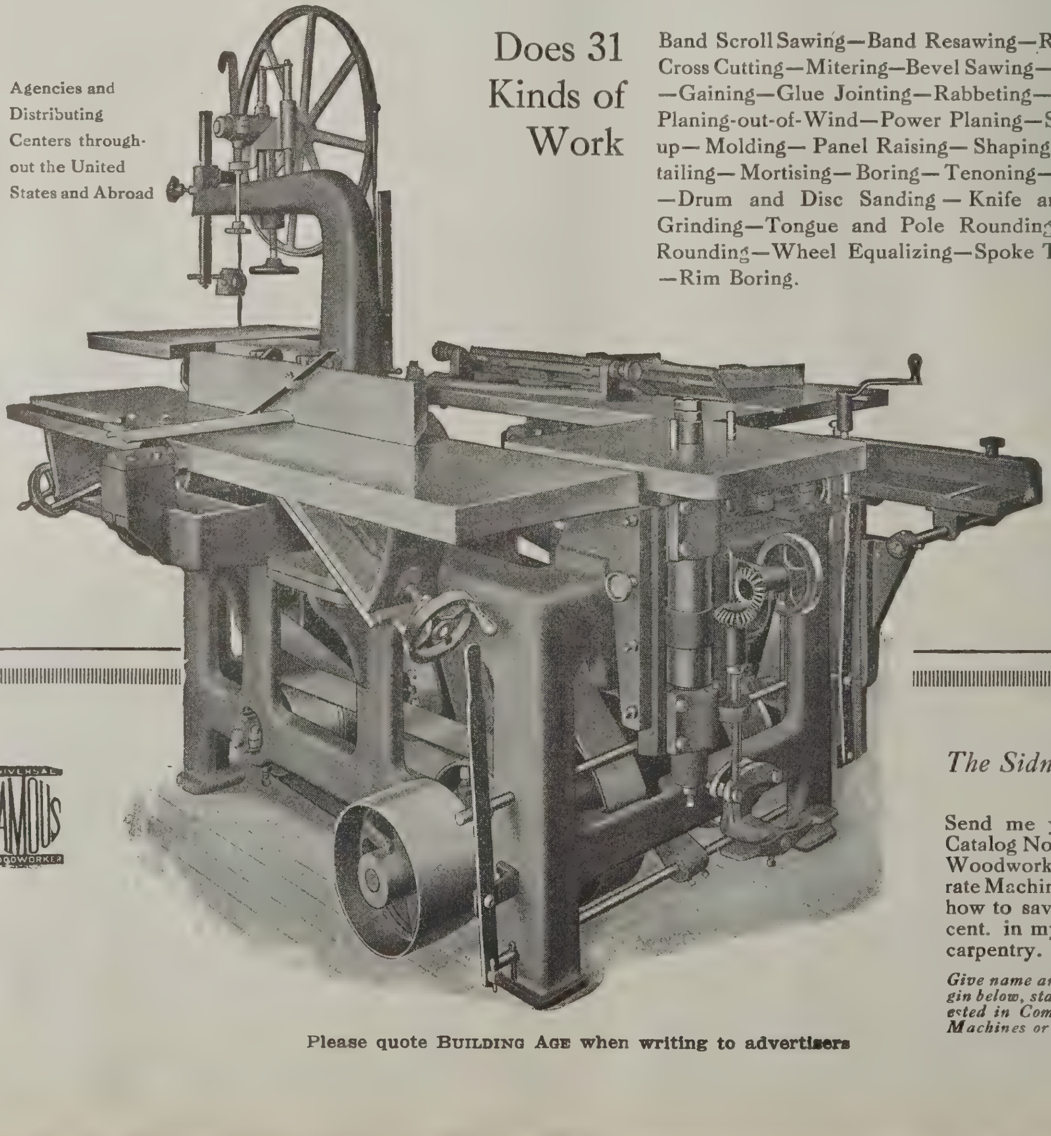
Furnished in any combination to fit your needs—27 or 32 inch Band Saw, 12 or 16 inch Jointer, Rip and Cut-off Saw Table, Shaper Borer and other attachments. Investigate! Send for our handsome new catalog. It shows a machine to fit every woodworking need.

Ask for catalog No. 10

The Sidney Tool Co., Box 100 Sidney, Ohio

Agencies and Distributing Centers throughout the United States and Abroad

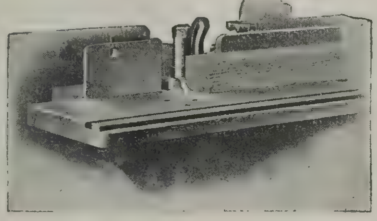
Does 31 Kinds of Work Band Scroll Sawing—Band Resawing—Ripping—Cross Cutting—Mitering—Bevel Sawing—Dadoing—Gaining—Glue Jointing—Rabbeting—Beveling Planing-out-of-Wind—Power Planing—Squaring-up—Molding—Panel Raising—Shaping—Dovetailing—Mortising—Boring—Tenoning—Routing—Drum and Disc Sanding—Knife and Tool Grinding—Tongue and Pole Rounding—Felloe Rounding—Wheel Equalizing—Spoke Tenoning—Rim Boring.



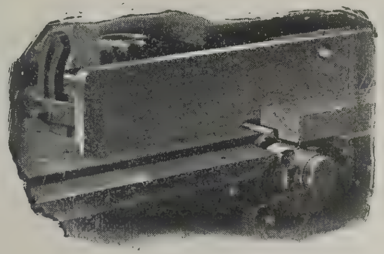
The Sidney Tool Co.
Sidney, Ohio

Send me your new 1914 Catalog No. 10, of Famous Woodworkers and Separate Machines and show me how to save 50 to 100 per cent. in my millwork and carpentry.

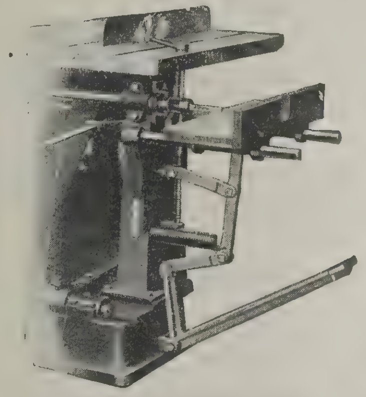
Give name and address in margin below, stating whether interested in Combination, Separate Machines or what.



Rounding Poles



Rabbeting



Hollow Chisel Mortiser

Disc Grinder

Jointer and Shaper in use at the same time

Driving the "Crescent"

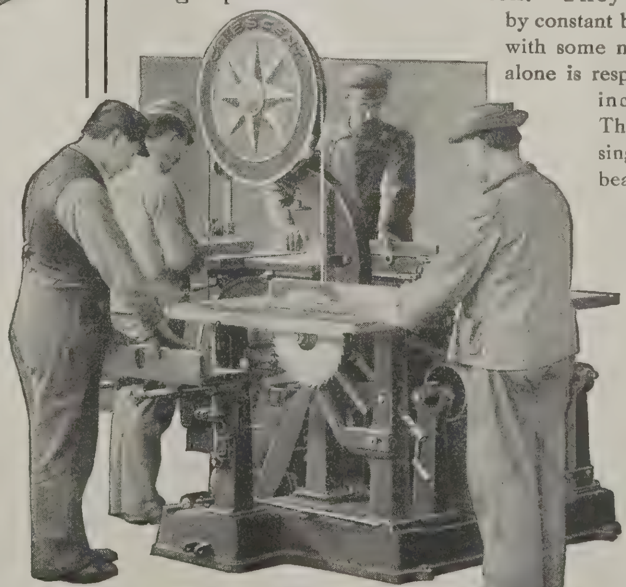
The speed with which the "Crescent" Universal Woodworker can be driven, when required, makes it a most profitable machine for woodworkers. It gets work out on time—no delays.

This is due largely to the fact that four men can work at the same time on this machine and turn out four different kinds of work at once. So much for rush jobs. On the other hand, when things are slack, one man can do any one or all of the fifteen different kinds of work that this wide range machine is capable of. Or, you can put two of the men to work on it.

Suit the "Crescent" to your work.

Each man can start and stop his own machine without interfering with the other men. The "Crescent" affords the use of shaper, band saw, jointer, saw table and borer, and by simply adding various attachments, panel raising, mortising, tenoning, tool or knife grinding, dadoing, sanding, resawing, pole rounding and moulding work may also be done.

Particular attention is directed to the easy, natural, upright position of the workmen. They are not fatigued by constant bending as is the case with some machines. This fact alone is responsible for greatly increased production. The "Crescent" has single work machines beaten to a standstill.



It will pay you to send for the New 144 page "Crescent" catalog. It tells all about this thoroughly practical machine in a most interesting way.

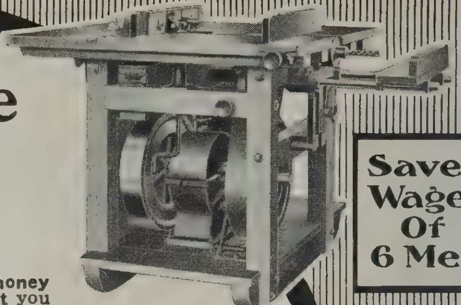
We also build a line of improved woodworking machinery that merits attention.

THE CRESCENT MACHINE CO.

206 Main Street Leetonia, Ohio

TRADE CHIEF MARK
OSHKOSH

Use $ense
—Make
Dollar$



Saves Wages Of 6 Men

Every saving of time and labor puts money into your pocket—Mr. Contractor! What you want is to do the job at the least possible expense, and your common sense tells you that it's a good investment to put your money into machines that cut the cost. Hundreds of Contractors have proved the money-saving and money-earning ability of

EVEREADY SAW RIGS

The Oshkosh "Eveready" Rigs make good on the job. They stand up to the work and do everything you ask of them. Extra sturdy construction, yet easily moved about; simple, easy to operate; powerful engine—bore 4¾, stroke 6 inches. Besides cross-cutting and rip-sawing, the "EVEREADY" joints, sands, jig-saws, grooves, bores, miters and grinds tools. Send for the big Oshkosh Catalog.

Also Built for Steam and Electric Power

OSHKOSH MIXERS

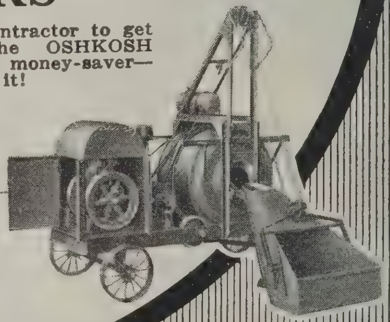
Send for it!

It will pay any Contractor to get acquainted with the OSHKOSH MIXER. It's a big money-saver—and we can prove it! Request brings full information, prices and special offer.

Live Agents Wanted in Open Territory

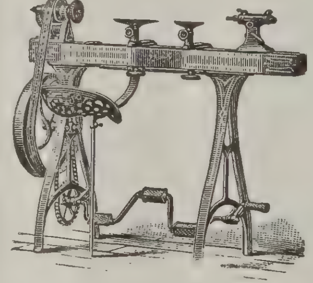
OSHKOSH MFG. CO.

541 S. Main Street
Oshkosh, Wis.



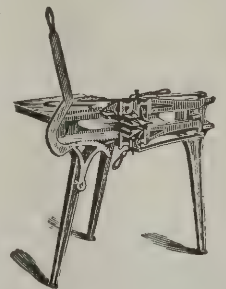
The Effective 4-Way Mix

Hand-Power-Foot WOOD-WORKING MACHINERY



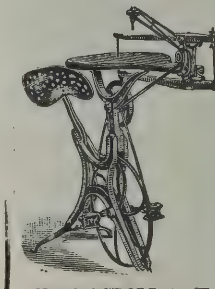
No. 3 LATHE

A Complete Line for a Carpenter and Builder



TENONER

Our Machines are so constructed that you can take them to the house you are building. Saves Time

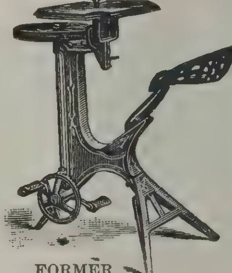


No. 2 SCROLL SAW

Why buy these Machines? BECAUSE

You can save a millman's profit.
You can make more money with less capital invested.
You can manufacture in as good style and finish, and at lower cost than the mill.
You can work up stuff ahead in winter for the spring rush in building.

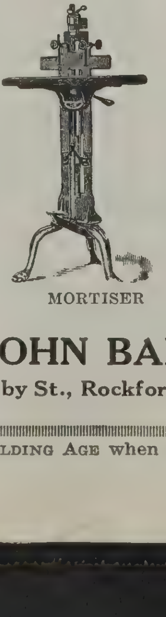
No. 7 SCROLL SAW



FORMER

10,000 builders are using from one to eight of our different machines.

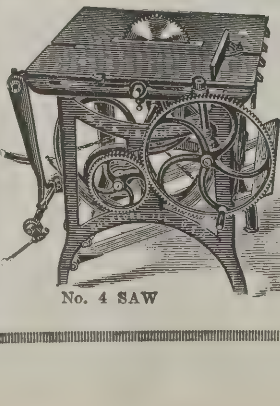
Any of our machines will pay for themselves in a year and often in a single job.



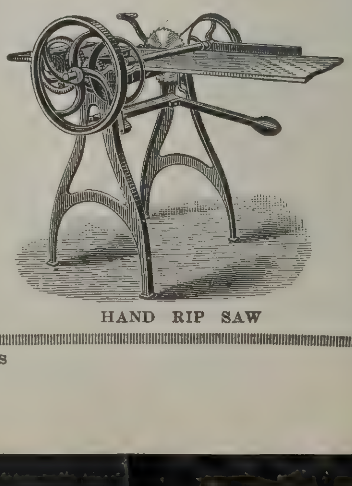
MORTISER

Our machines are not complicated, but simple, strong, practical and built for good hard work.

Send for Catalogue and Prices.

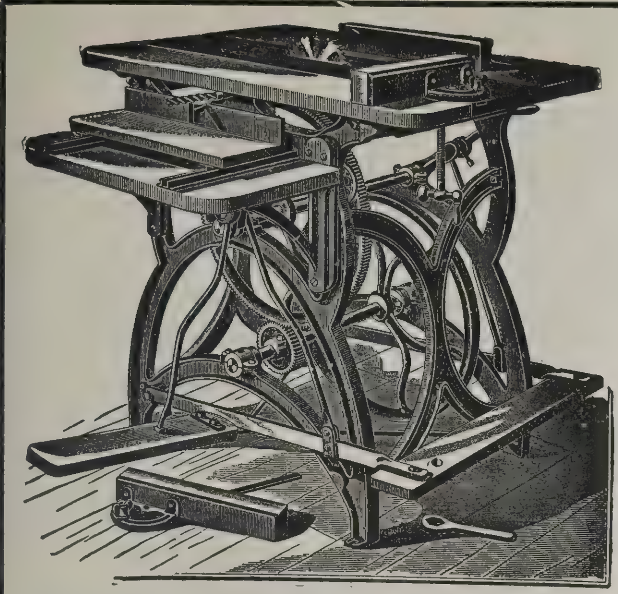


No. 4 SAW



HAND RIP SAW

W. F. & JOHN BARNES CO.
71 Ruby St., Rockford, Ill.



MARSTON'S HAND AND FOOT POWER CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron, accurately planed, with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine-cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight complete 350 pounds. Send for catalogue.

J. M. Marston & Company

201 Ruggles Street, Boston, Mass.

"AMERICAN"

CONTRACTORS' PORTABLE VARIETY

WOOD-WORKER

A Four-Man Machine

A contractor writes us "I have lost only one of the jobs I bid on since I put in your ('American') Wood-Worker." He knows what his "American" saves him and under-bids his competitors by that amount.

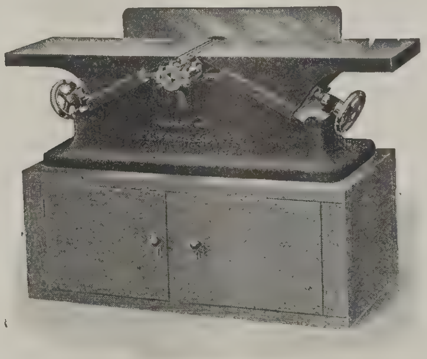
Why don't you?

Send for the "American" Pamphlet No. 47

American Saw Mill Machinery Company

82 Main Street
HACKETTSTOWN, N. J.

1362 Hudson Terminal
NEW YORK CITY



Every Builder and Contractor Needs Me—

¶ In a small shop I will take care of all planing, jointing, rabbetting, etc.

¶ In a large shop I will start quicker and do the small jobs just as well and at less cost than my bigger brothers.

¶ I am so handy that the hand plane is practically eliminated wherever I am used.

¶ I can be placed on a bench, a cabinet, or on an iron pedestal.

¶ I take up small floor space.

¶ I consume hardly any power in operation.

¶ I am quickly adjusted for different kinds of work.

¶ I have tables with lips of steel, mounted on inclines.

¶ I can not cut off any fingers as I am fitted with a patented circular safety cutterhead.

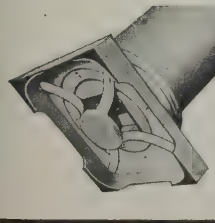
¶ I will turn out perfectly smooth work because my safety head is round, runs true and is fitted with thin, air-hardened "Tungsten" steel knives which require sharpening only once a week if jointing attachment is properly used.

¶ I have made money for every wood-shop in which I am used.

¶ I am sold at a price within the reach of any shop owner, and quickly pay my own way.

¶ I AM THE FAY-EGAN "Lightning" No. 254 BENCH HAND PLANER AND JOINTER

To find out more about me ask J. A. FAY & EGAN CO., 221-241 West Front Street, Cincinnati, O., to send you Bulletin H-7.



Bottom view showing center bearing.

THE ZIMMERMAN IRON BASE

is the ONLY BASE having a CENTRE-BEARING. It carries the required weight without allowing the corner supports to sink into the floor and prevents the base of column and floor from rotting.

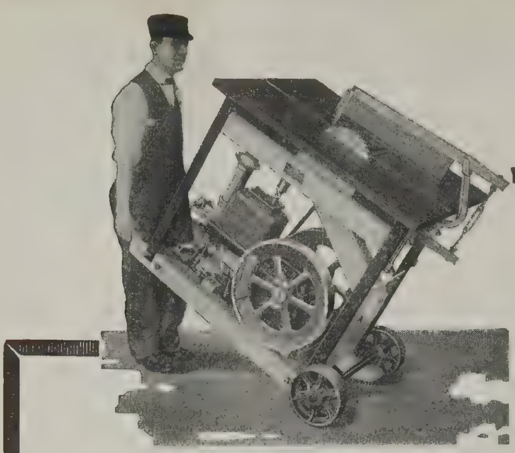
See Us in "SWEET'S INDEX," Page 958

Manufactured by

S. CHENEY & SON
Manlius, N. Y.

Notice the open center of the turned wood base which ventilates the column shaft, preventing it from opening.

WHEEL This PORTABLE SAW-RIG
To Any Part of Your Job



AS PIONEERS in the manufacture of Portable Saw Rigs we are entitled to claim that we manufacture the best Portable Saw Rig on the market, in fact, we have five complete sizes to meet every requirement of the trade.

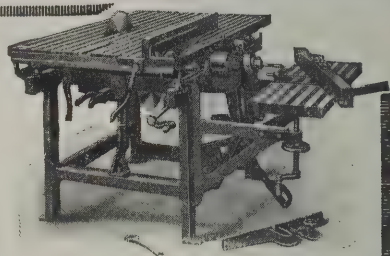
Write us for our new attractive catalog just off the press.

C. H. & E. MANUFACTURING CO., Inc.
330 Mineral Street, Milwaukee, Wis.

For general use in the shop or on the job the

Beach Double Arbor Rip and Cut-Off Saw

has no equal. We call special attention to these features:



A Rolling Table for cut-off and miter work—so easy of operation that with a 1,000 pounds weight on it can easily be worked back and forth with the pressure of one finger. Can be instantly locked for ripping or beveling. A wide removable throat for use of Jointer or Dado Head. An extension that allows you to easily work 18' lumber.

A Boring Attachment that has a longitudinal movement of the bit.

The Double Arbors will carry 19" Rip and Cut-Off Saws or Dado Head—allowing you to change instantly from one to another. Capable of doing any sawing from the finest inside finish to timbers 7" thick.

Every machine guaranteed; defective parts replaced, and machine may be returned if not absolutely as represented.

Write for Catalog

BEACH MFG. CO., Montrose, Pa.

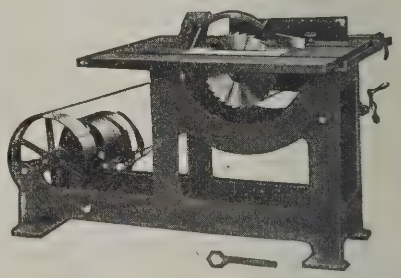
Silver's New Swing Saw

Four Lengths

Send for Catalog No. 60 Today

It fully illustrates and describes a splendid new line of wood working machines made for those who desire positive high-grade quality for every penny invested.

Jointers, 8, 12, 16, 20 and 24-in.
Band Saws, 20, 26, 32 and 36-in.
Swing Saws, 6½, 7, 7½ and 8 foot.
Saw Tables—Two Styles.



The Silver Mfg. Co.
350 Broadway **Salem, Ohio**

Parks Portable Single or Combination

WOODWORKING OUTFITS

ARE The MOST PRACTICAL—The MOST EFFICIENT—The MOST ECONOMICAL WOOD WORKING EQUIPMENT YOU CAN BUY.

This machine is a combination of circular rip and crosscut saw, 6-inch or 12-inch jointer with tilting guide, boring attachment, jig saw with tilting table sand disk and gasoline engine guaranteed to do the work.

Angle steel frame is the strongest structural material known.

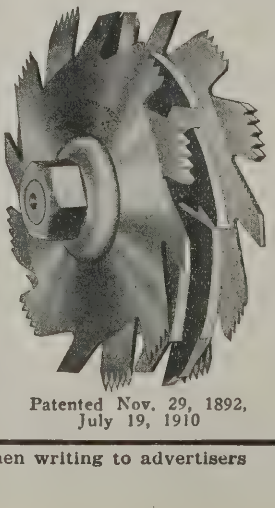
Machines made in large quantities which allows us to sell at lowest prices and make prompt shipment.

Write for catalog.

PARKS

BALL BEARING MACHINE CO.
Station A
CINCINNATI, O.

Huther Bros. Patent Dado Head



Patented Nov. 29, 1892, July 19, 1910

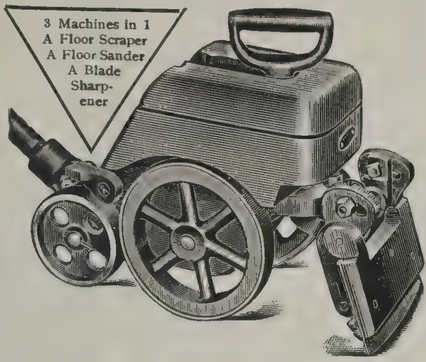
Fits Any Saw Rig

Cuts perfect grooves with or across grain, any width groove. Rapid, no-screw adjustment.

Write for our sent on approval offer. New illustrated catalog on request.

Huther Bros.
Saw Mfg. Company
2500 University Ave.,
Rochester, N. Y.

$15.00 a day CLEAR PROFIT



Go after the floor smoothing jobs now and make the winter as profitable as summer. The TRIPLE "A" SPRING DRIVEN FLOORSMOOTHER will finish about 18 squares a day. Average net profit per day—$15.00 or over.

SPRING DRIVE LESSENS WORK

The Triple "A" is the only floorsmoother that has the SPRING DRIVE. When you push the machine forward the spring winds; stops the machine and starts it back on the cutting stroke. Only one operation required—the push forward. The machine comes back itself. Just guide it, that's all. The SPRING DRIVE lessens the work two-thirds. Increases the workman's capacity threefold.

We'll sell the TRIPLE "A" to you at a low price, or on easy monthly payments. Write today for full particulars.

TRIPLE "A" MACHINE CO., Room 326, 300 West Grand Avenue, Chicago, Ill.

Buy a Stern Floor Scraper

This Month and Save $7.00.

SIMPLE—ACCURATE—RAPID

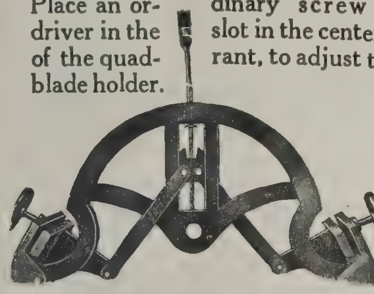
Will hold any size blade up to 3½"x7". No specially designed blade required. Every hardware store has a blade that will fit. Satisfaction or **your** money back.

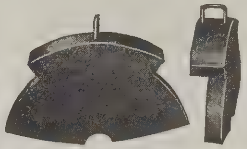
The Stern Manufacturing Co.
Lancaster, Penna., U. S. A.

The handle and blade can be adjusted to a thousandth part of an inch.

Blades removed and replaced instantly by a turn of the hand.

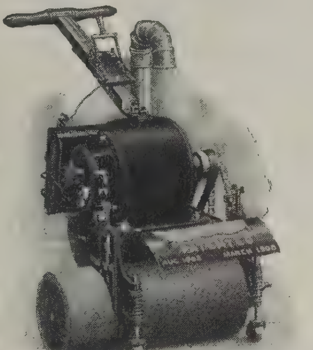
Place an ordinary screw driver in the slot in the center of the quadrant, to adjust the blade holder.





Weights Removed

Schlueter's "Rapid" Floor Surfacer



Most simple constructed machine, no gears or clutches to wear—direct chain drive—automatic dust collector or blower.

Over 15,000 in use all over the world.

The "Rapid" method is guaranteed to remove all joints or warped edges. It will remove shellac, varnish, oil, wax, lime stains or "muck" from roller skate wheels in a most satisfactory manner.

Send for prices and FREE TRIAL proposition.

Patentee and Manufacturer
M. L. SCHLUETER
Motor-Driven Flexible, Self-Propelling
Demonstrating and Salesroom:
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NO MONEY IN ADVANCE

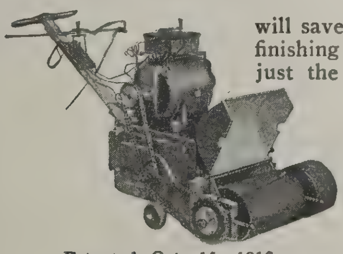
5 DAYS FREE TRIAL

John F. Weber, Pres.
Weber Mfg. Co.
672 71st Ave. West Allis, Wis.

The WEBER DOUBLE ACTING Floor Scraper

The AUTOMATIC BALL BEARING Electric

Floor Surfacing Machine



Patented Oct. 15, 1912.
Made in several sizes.

will save you money by rapidly finishing your new or old floors just the way you want them. Is self-propelling — you simply guide.

Write today for Booklet telling all about the machine, our *free trial offer* and list of users near you.

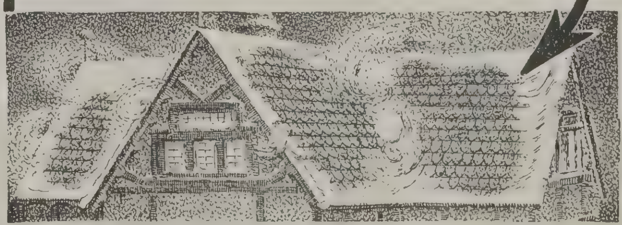
WAYVELL CHAPPELL & CO.
Dept. E, 4844 E. Ravenswood Avenue, Chicago

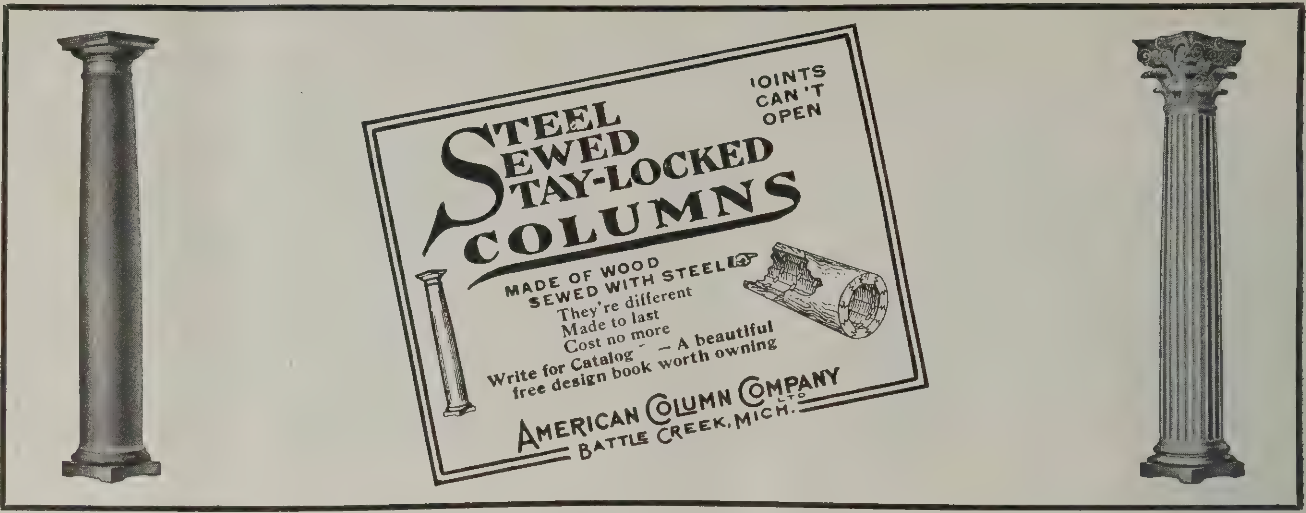
Withstand Winter Weather

Snows and blows and everything else that goes with "a hard winter" cannot drive nor drift past the sidelock and overlap of Cortright Metal Shingles.

Contractors appreciate the fact that any of their men can lay them successfully. There is very little waste as compared to wood shingles or stone slate, and absolutely no fire risk. Cortright Metal Shingles last as long as the building and never need repairs.

Cortright Metal Roofing Co.
Philadelphia and Chicago

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JOINTS CAN'T OPEN

MADE OF WOOD SEWED WITH STEEL
They're different
Made to last
Cost no more
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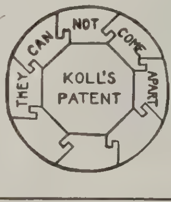

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DRAWING TABLE

made? If so, send for illustrated catalogue and prices

R. E. KIDDER

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STOP THOSE RATTLING WINDOWS

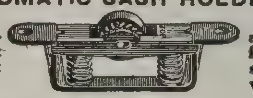
Do away with sash weights, cords, pulleys and pocket frames and save money by using

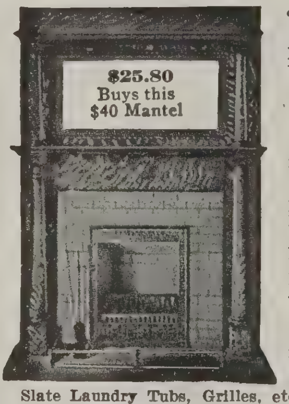
AUTOMATIC SASH HOLDERS

Proved by Use—Unexcelled for windows without pocket frames. Excellent for new windows.

Send for circular and prices, or $1.00 for trial set prepaid; state approximate weight of sash.

AUTOMATIC SASH HOLDER MFG. CO., Church St., New York.





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(on approval) PRICE ON THIS **High Grade, Selected Figure, Golden Oak Mantel is**

$25.80

Dealers' price, $40 to $50.

It is 81 in. high, 60 in. wide, 28 x 16 French Bevel Mirror, four heavy columns.

Includes Tile Facing, 60 x 18 Hearth. Plated Frame and Club House Grate. Fenders $8.00 extra.

Furnished with Full Length Columns or Double, as shown in cut. **HARDWOOD FLOORS and PARQUETRY** will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

TILE and MOSAICS
for everywhere, WALLS, FLOORS.

Write for catalog for Mantels, Grates, Tile for floors and baths, Slate Laundry Tubs, Grilles, etc. It is FREE. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from $12 to $200. Made-to-order Fly-Screens for doors and windows.

W. H. OSTENDORF, 2923 N. Broad St., Philadelphia, Pa.

Can be used as a

Music Cabinet Book Case or China Cabinet

$25.00 in the white.
Freight paid to your station.

Chicago Grille Works

828-838 Wells Street
CHICAGO, ILLS.

OAK FLOORING "America's Best Flooring"

Builders and Owners will find it a clinching argument to say "It's floored with OAK FLOORING." It is the biggest single feature to look for in any house or apartment building. It imparts an air of *refinement* and *elegance*. *It is the modern flooring.*

OAK FLOORING ⅜" thickness by 1½" or 2" faces can be laid over old floors in old homes or over cheap sub-floors *at a very low cost*. *It is cheaper than carpets or pine flooring.* When laid it has all the appearance of heavy flooring. There is a *solid satisfaction* and *lasting* pleasure in the *substantial and dignified appearance* of OAK FLOORING.

Contractors and *carpenters* find it very *profitable* to lay ⅜" stock over old floors in old homes during dull periods. A little *canvassing* is all that is necessary to secure jobs. A carpenter or handy man can lay OAK FLOORING successfully. For *durability* OAK is the best. OAK FLOORING laid *thirty years ago*, after very hard use, is still in good condition. *Write for booklet.*

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The New Home
and the Garbage Can

Include it in your plans. No new home or bungalow complete without the *Majestic Built-In Garbage Receiver.* Keeps the can in the kitchen but out of sight. Saves hundreds of steps. Is handy, clean, odorless, convenient, and sanitary—fly and insect proof. Can is removed and emptied from outdoors.

MAJESTIC Built-In Garbage Receiver

There is nothing like it. Absolutely sanitary because every time used a supply of disinfectant automatically is sprinkled over contents. Has vent pipe connection. Container is substantially built of cast iron. Can is durable galvanized iron sheeting. Investigate, get particulars and low price.

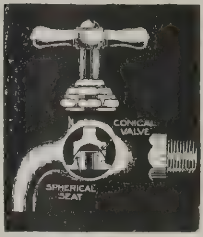
FREE BOOKLET

Write at once for descriptive booklet that describes it in detail and explains its many advantages. It can be easily installed in any house in course of construction or with little trouble can be built into any completed home.

Write Today

The MAJESTIC CO., 504 Erie St., Huntington, Ind.

A faucet may seem a little thing, yet—it causes a lot of trouble and expense



Every old-style washer faucet leaks sooner or later. That means new washers, repairs, delays and porcelain stains.

Why not save all this needless discomfort and expense by installing the

J-M Washerless Faucet

It can *never* leak—we guarantee that. The illustration shows why. A conical valve engages a spherical seat in close metal-to-metal line contact. No washer is ever needed. No screwing down of valve. No hammering, whistling, or splashing.

Guaranteed to give perfect service in ordinary use for 10 years. A new seating FREE if it fails to do this.

Made in Wash Tray Faucets, Sill Cocks, Bath Cocks, Lavatory Faucets, and all modern combinations. **Write our nearest Branch for Booklet**

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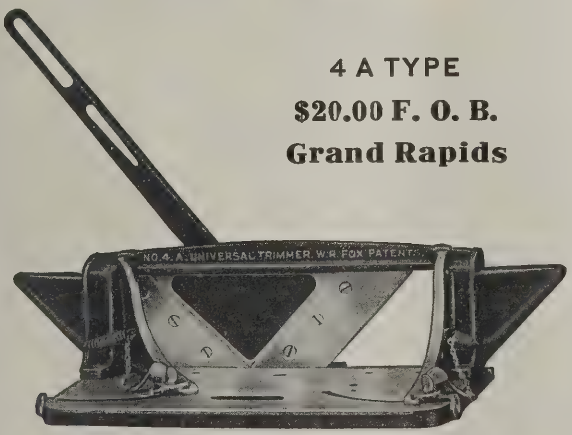
FOX
"UNIVERSAL TRIMMERS"

4 A TYPE
**$20.00 F. O. B.
Grand Rapids**



Height cut on gauge 4". Length cut on bed 7¾"

PERFECT JOINTS and TIME SAVED

are results obtained by using the Fox "Universal Trimmer" for Fitting Interior Finish.

Machine illustrated only one of our complete line of these tools.

FOX MACHINE CO.
655 Front Avenue, N. W.
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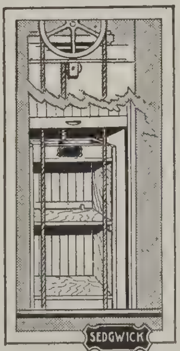
REPUTATION AND PROFITS

The Very Best DUMBWAITERS



are none too good! Inferior DUMBWAITERS are a nuisance.

Some Dumbwaiters get constant service.

Some Dumbwaiters are abused.

Some Dumbwaiters are neglected.

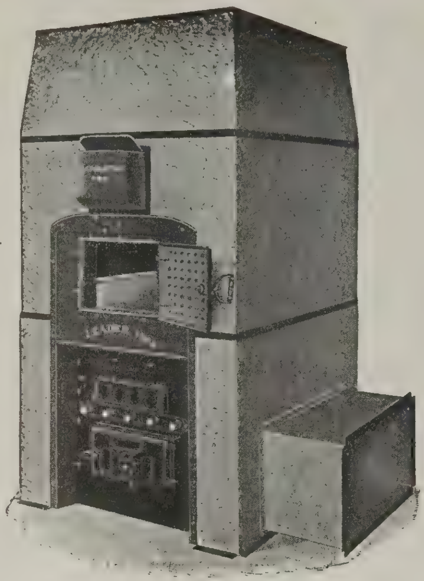
SEDGWICK DUMBWAITERS are designed and built to give satisfaction under all these conditions.

The SEDGWICK DUMBWAITERS are guaranteed by the makers and the makers stand back of their guarantee.

Send for catalogue L and keep it at hand for reference—all sizes and types carried in stock.

You can select what you want and get what you select without delay.

Sedgwick Machine Works
123 Liberty Street
New York City



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Our furnace business with contractors is so satisfactory to the contractors and to us that we do not solicit the business of dealers. We are sharing our profits with contractors, however, and making it to their interest to procure their furnace equipments from us.

MONEY for

We offer the contractors a special discount from our net factory prices on furnaces, pipes, registers, etc., which is a concession we are not offering to any other class. In addition to this, we offer a bonus for information concerning buildings, and this information requires no time nor effort on the part of the contractor.

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We supply, free, detailed plans for heating, and we deliver complete heating equipments, including all pipes and registers, made to measure; we loan tools and thus enable contractors to buy and put up furnace outfits with their own help, at a considerable saving from the price of local dealers, at the same time assuring successful and satisfactory heating. If you are a contractor, we urge you to give us a trial. You will be surprised and pleased. Free booklet.

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ELBERT HUBBARD, *Editor*

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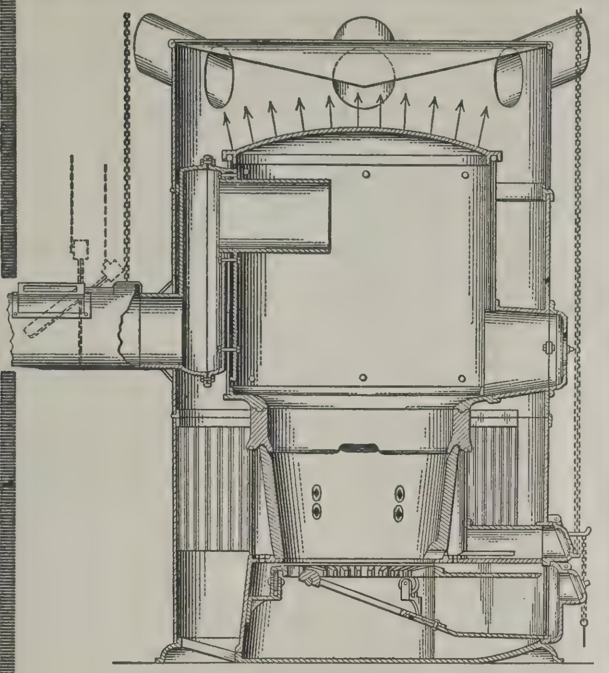

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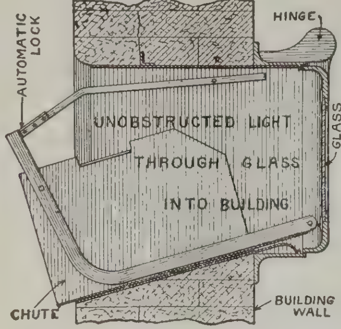

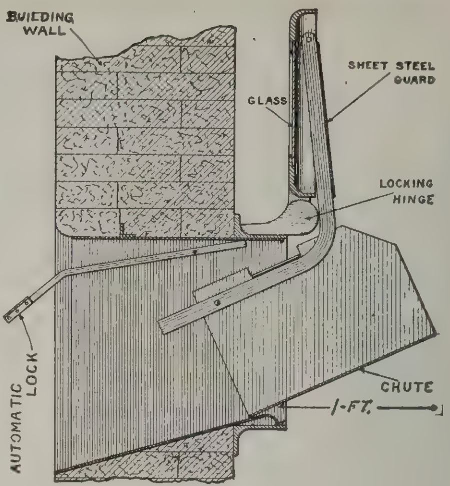

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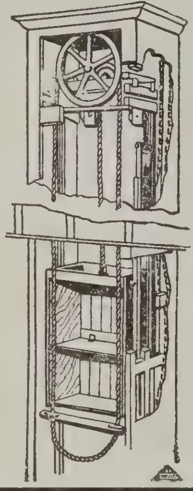

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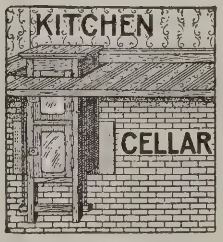

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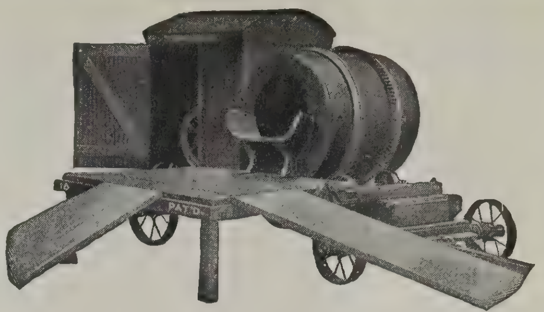

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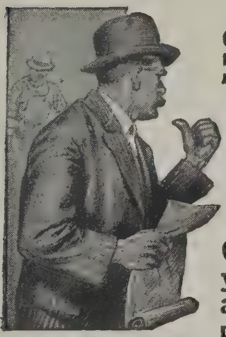

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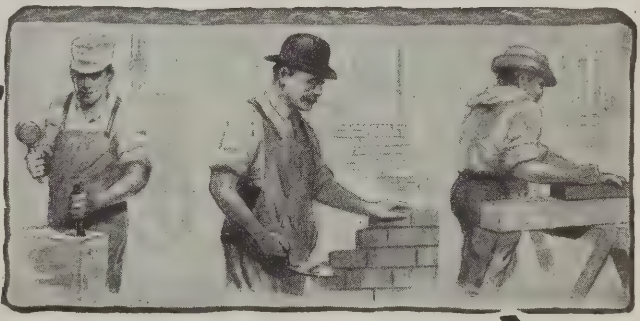

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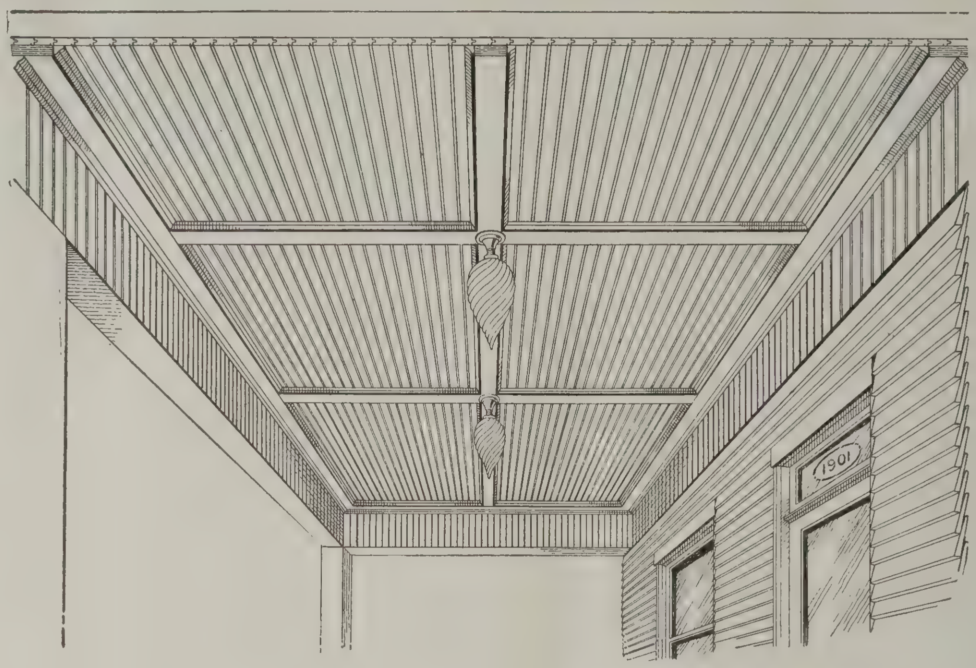

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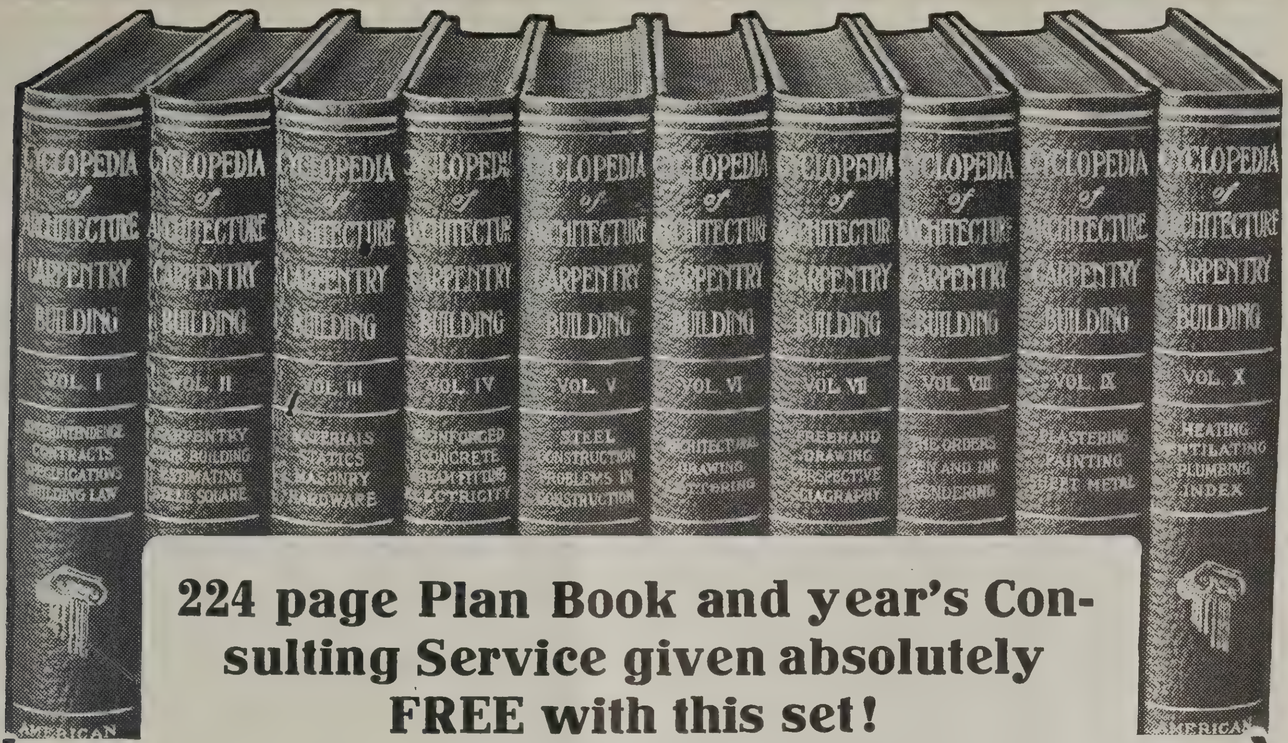
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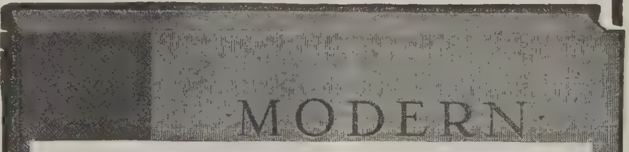

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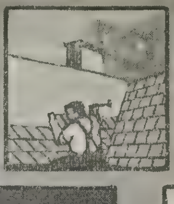

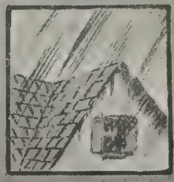

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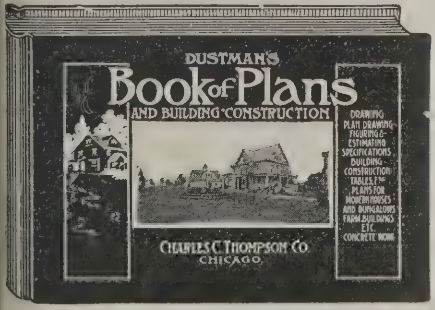

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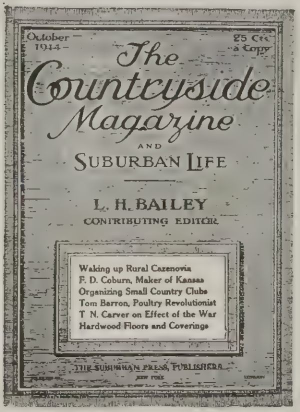

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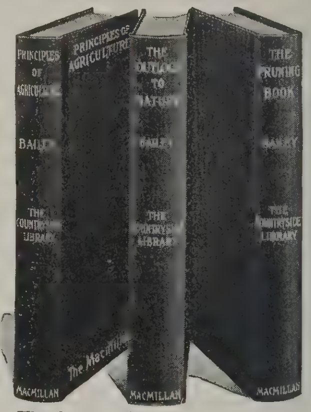

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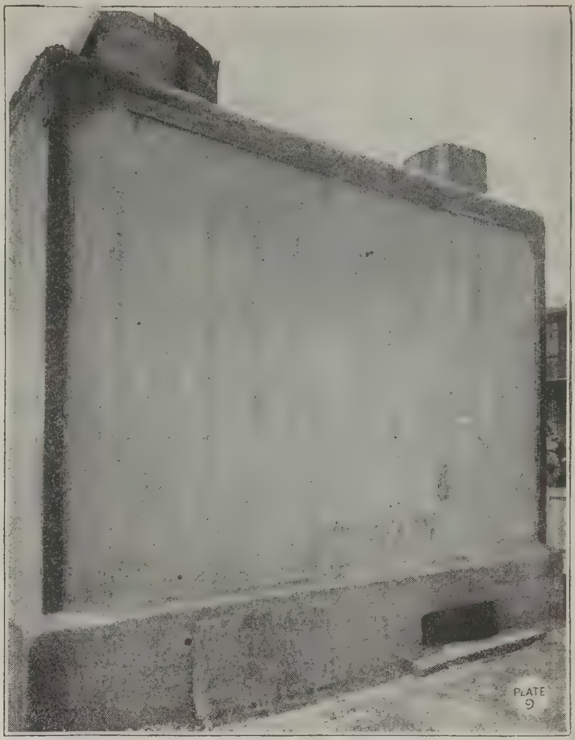

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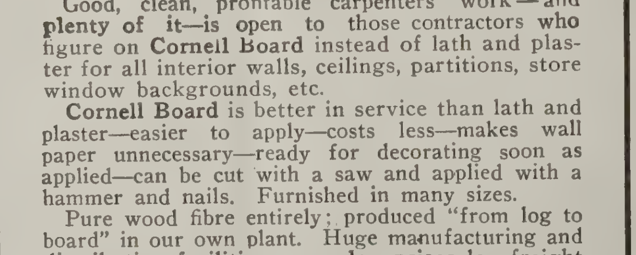

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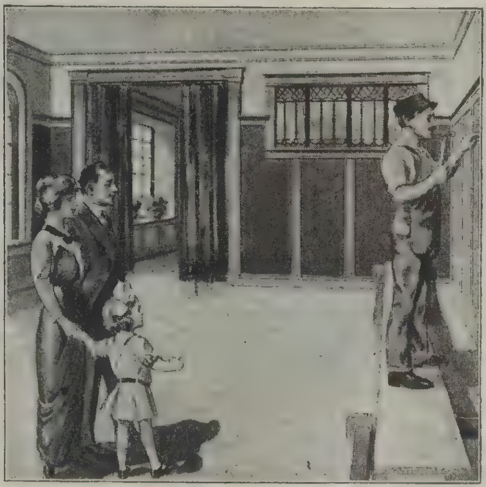

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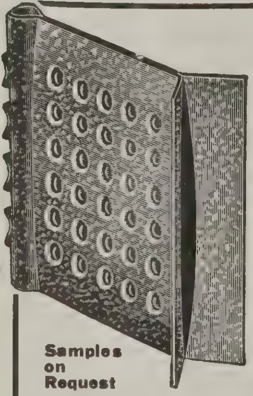

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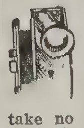

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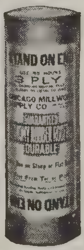

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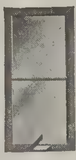

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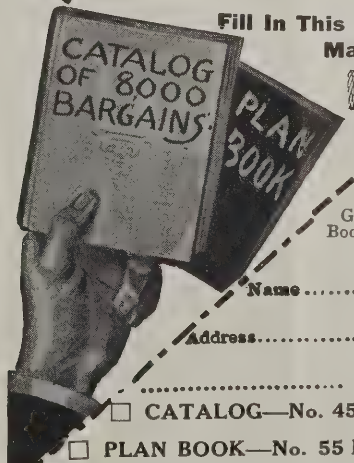

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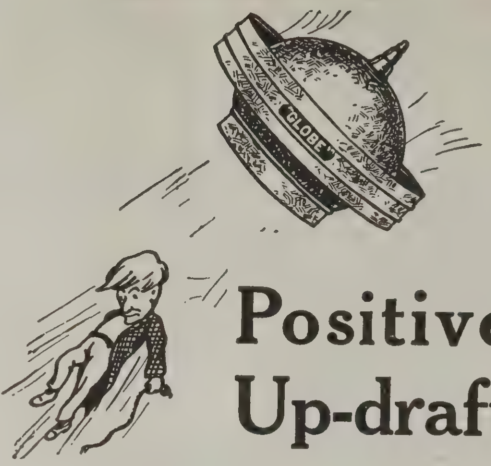

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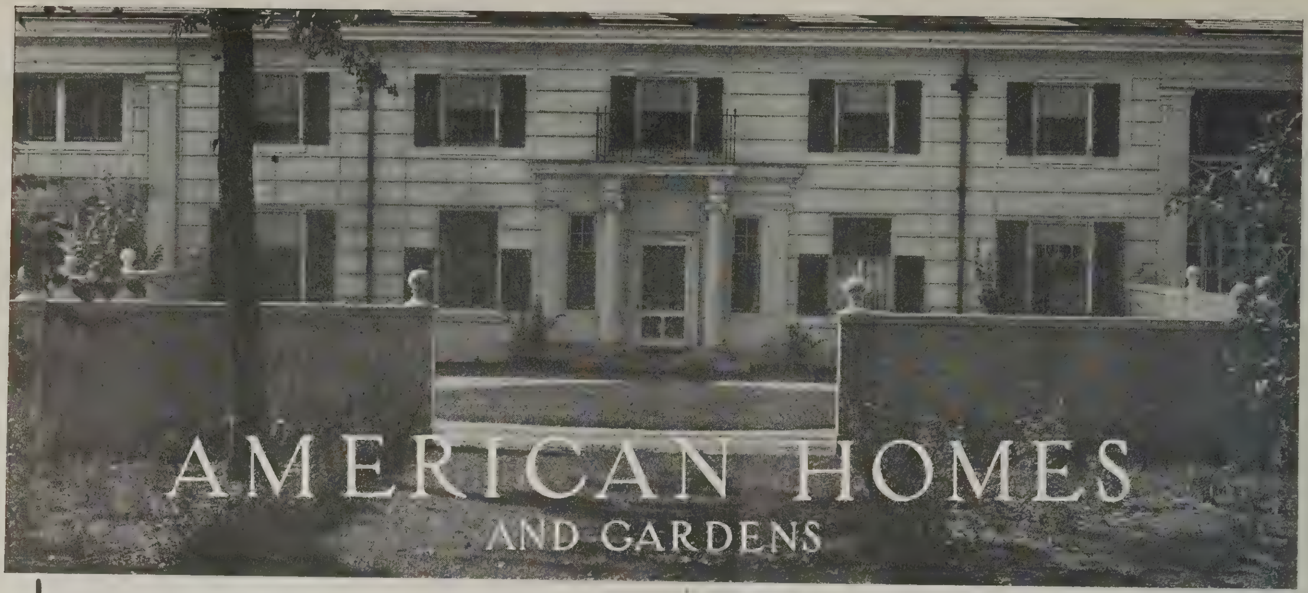

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Mastic Wall Board & Roofing Co. 3
Mathews Slate Co............. 93
Maximilian Co................ 14
Meurer Bros. Co..............100
Millers Falls Co.............. 85
Milwaukee Corrugating Co....107
Morton, Thomas 86
Mullins, W. H., Co............100
Myers, F. E., & Bro........... 82

National Sheet Metal Rfg. Co.. 98
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North Bangor Slate Co........ 92
North Bros. Mfg. Co.......... 78
Northrop, Coburn & Dodge Co..100
Northwestern Compo Board Co.. 76
North Western Expanded Metal Co. 95

Oak Flooring Bureau........... 10
Oshkosh Mfg. Co.............. 6
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Parks Ball Bearing Mach. Co... 8
Pearson Mfg. Co............. 80
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Provident Slate Co........... 93

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Washburne, E. G., & Co....... 87
Weber Mfg. Co............... 9
White, David, Co............. 80
White, L. & I. J., Co......... 77
Wood Mosaic Co.............. 2

York Automatic Dumb Waiter Co. 14

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It means an end to ROOFING EXPENSE, ROOFING DANGER and ROOFING TROUBLES.

When you put it on your buildings you are putting on INSURANCE. Every sheet means "MORE PROTECTION."

Fire, Lightning, Storm, Rain and Wind Proof.

Cheaper than wood Shingles or Slate and 100 per cent better.

THE MOST BEAUTIFUL ROOF IN THE WORLD.—Ornamental and Lasting

Consist of 99.9% pure, open hearth iron. This, combined with perfect galvanizing, enables us to give you a roof that will last! Over a quarter century experience is back of all our products, which include corrugated, v-crimped and roll Roofing, besides shingles and other metal specialties.

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Here is an investment that pays unusually large dividends to

Carpenters and Builders

Galvanized Shingles can be laid by a Carpenter or Roofer quicker than any other material.

No Soldering required, just nails; the lock and flange take care of the rest. Under no condition can any of our DICKELMAN EXTRA Metal Shingles or Tile ever blow off.

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Reduce the cost of insurance, being both fire and lightning proof. Lightning was never known to strike or injure a building covered with a metal roof.

Can be successfully laid by any workman who will read and follow our printed instructions. No solder is used; only a pair of snips and a hammer are needed.

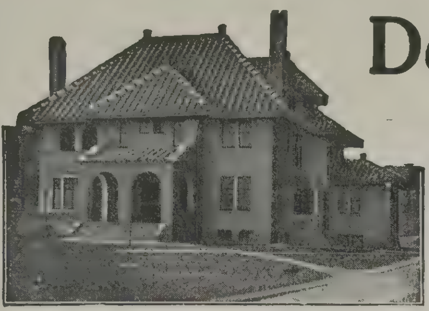
Write for FREE CATALOG

Offers many valuable roofing suggestions. Explains "Dickelman Quality" and guarantee.

Many different designs in painted tin, galvanized or copper. Easy to lay, economical, beautiful.

If you are a builder and contractor, let us know, for we have a profit-sharing arrangement which we make with builders, and it would pay you to ask us about it.

The Dickelman Manufacturing Co. Dept. B **Forest, Ohio**



Don't Miss This Opportunity

We Want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a liberal commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are now devoting their entire time to selling our metal roofing. Others have made big profits simply devoting part of their time to selling and laying our Metal Spanish Tile.

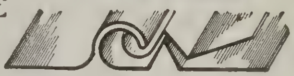
Edwards Metal Spanish Tile

Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized; size, 10x14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TO-DAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that some one else will be given your territory. DON'T DELAY. WRITE TO-DAY FOR OUR SPECIAL AGENTS PROPOSITION.



Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

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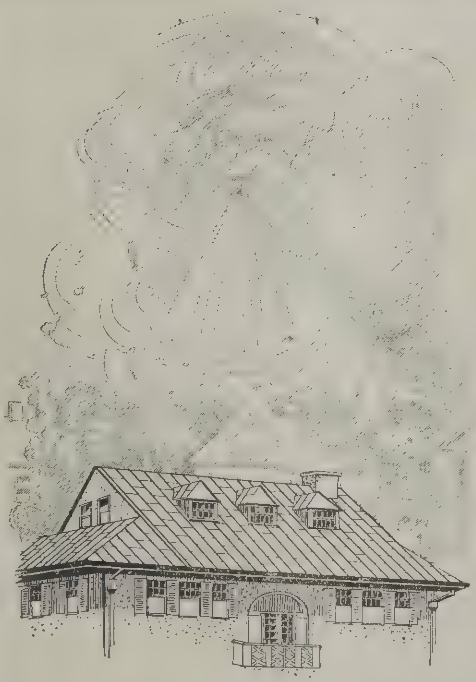
THE WORLD'S LARGEST METAL ROOFING, METAL SHINGLES AND METAL CEILING MANUFACTURERS



Even Old Boreas Gives It Up!

Our Roofing Tin proves its true worth when tested by storm. Old Boreas, traveling through space at sixty miles an hour, is prone to sweep every roof in his path unless it is made of

Copper Bearing Open Hearth ROOFING TIN

manufactured exclusively by this company. Send for booklet "Copper—Its Effect Upon Steel for Roofing Tin." It contains a message of special interest to you.

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View of
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Metal Lumber

This light, strong, fire-resisting structural material eliminates cracked plaster, gaping woodwork and other evils caused by the warping of wood lumber.

It can be erected quicker than wood—saves time and labor—reduces erection costs yet makes a 100% better job. Send for a copy of our interesting catalogue; a card will do.

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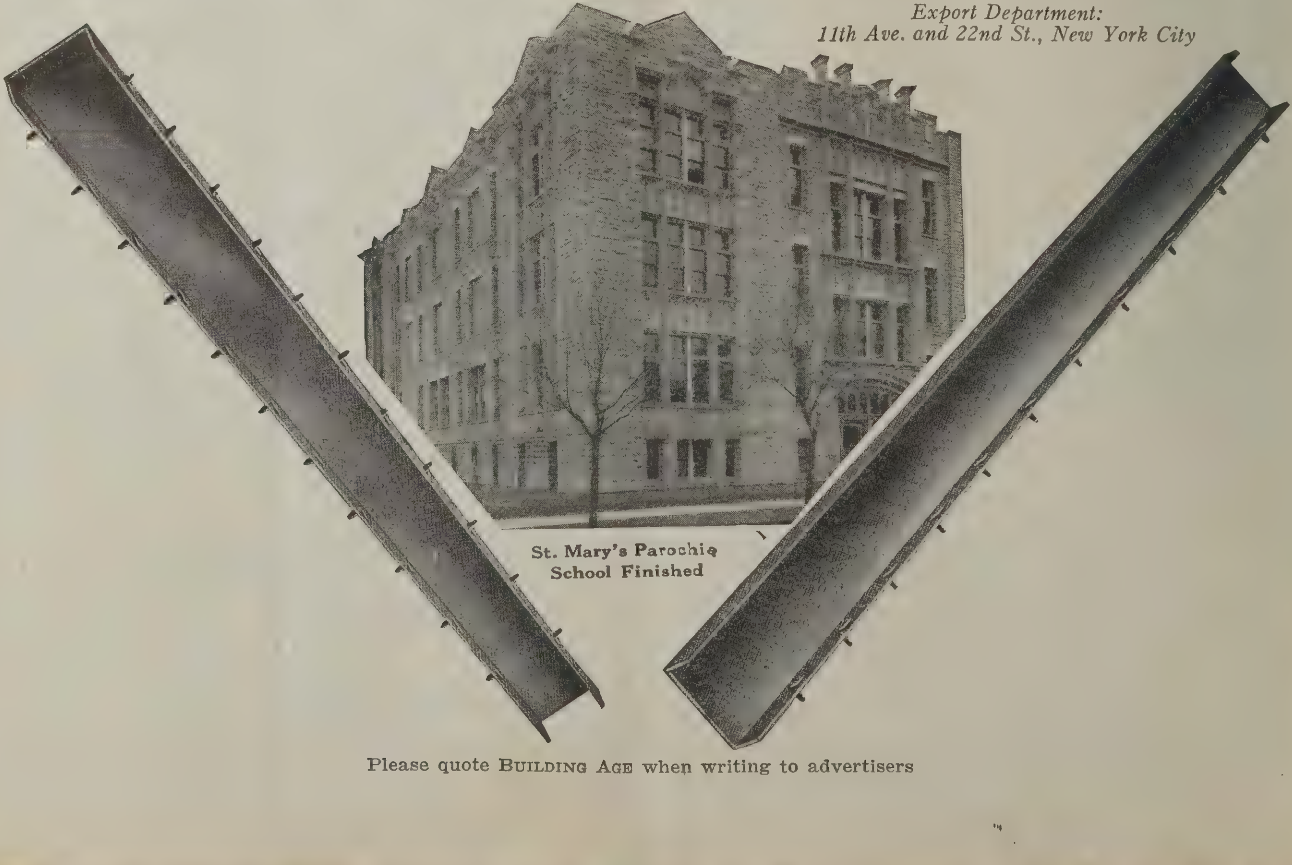

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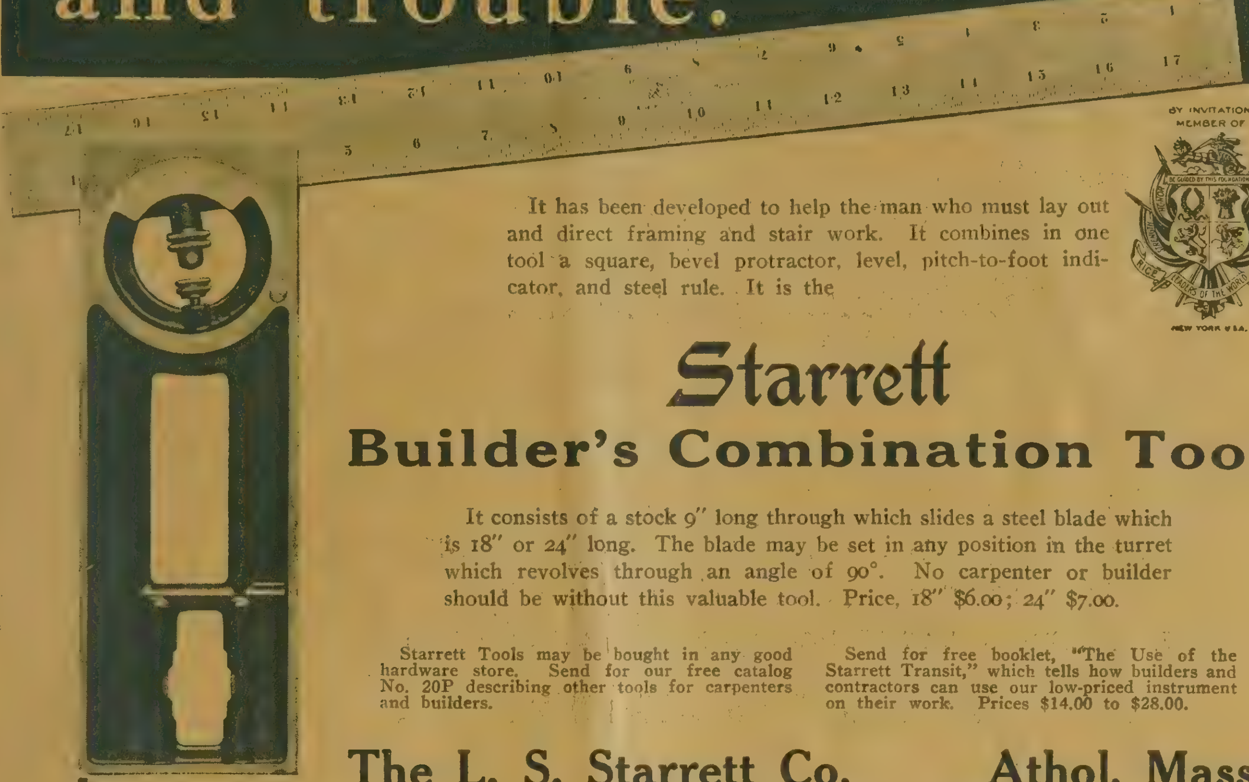
This tool saves time and trouble.



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It has been developed to help the man who must lay out and direct framing and stair work. It combines in one tool a square, bevel protractor, level, pitch-to-foot indicator, and steel rule. It is the

Starrett
Builder's Combination Tool

It consists of a stock 9" long through which slides a steel blade which is 18" or 24" long. The blade may be set in any position in the turret which revolves through an angle of 90°. No carpenter or builder should be without this valuable tool. Price, 18" $6.00; 24" $7.00.

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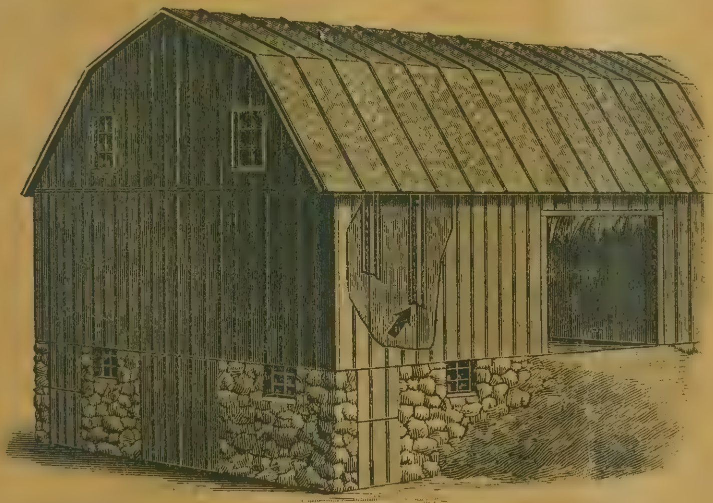

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Here is an opportunity to improve construction without additional expense.

LUMBER YARDS SHOULD CARRY METAL BARN BATTEN IN STOCK.

They allow for expansion and contraction of the siding. Will not warp or split.

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MILWAUKEE CORRUGATING CO.

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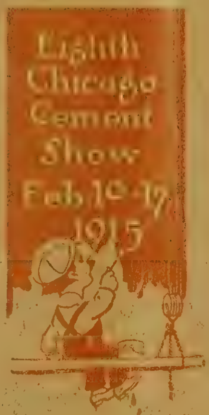

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